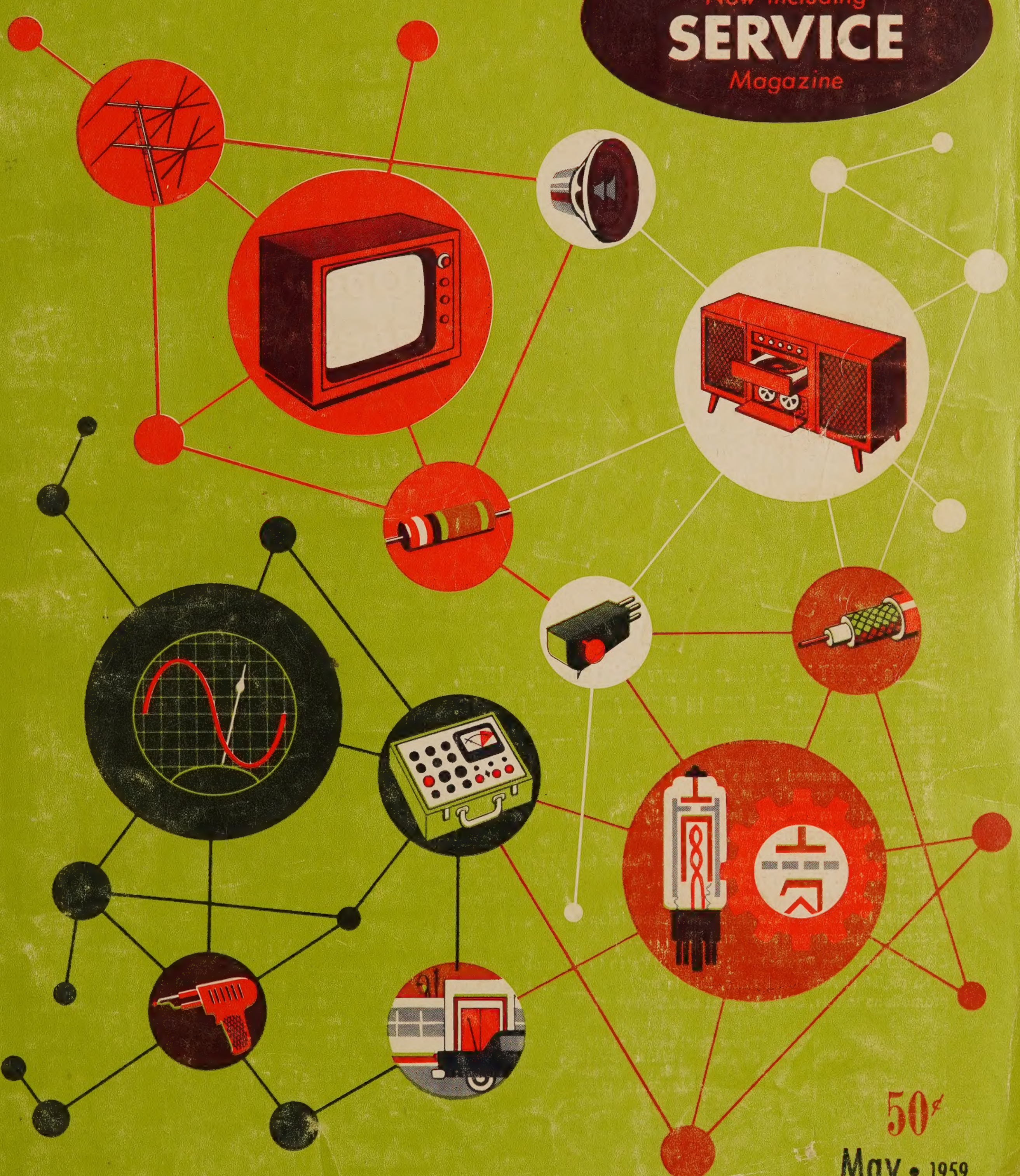
1959-60 ANNUAL BUYERS DIRECTORY ISSUE

ELECTRONIC TECHNICIAN

Now Including
SERVICE
Magazine



50¢

May • 1959

Electro-Voice®

Power Point® PLUG-IN CARTRIDGES are on the move!

Look
for the
E-V
trademark
EV

Opening Gun in the Biggest Sales Push Yet!

There's PROFIT in E-V Stereo Power Point Cartridges! NEW, IMPROVED MODELS — USED IN MORE AND MORE PHONOS. PERFECT FOR CONVERSION TO STEREO NOW — LOW COST!

These new, improved Stereo Power Points are a gold mine. They out-perform by far the old-style replaceable-needle cartridges. More and more of them are being installed daily in tone arms by manufacturers. Yet they cost the same, or less, than old-style needles alone!

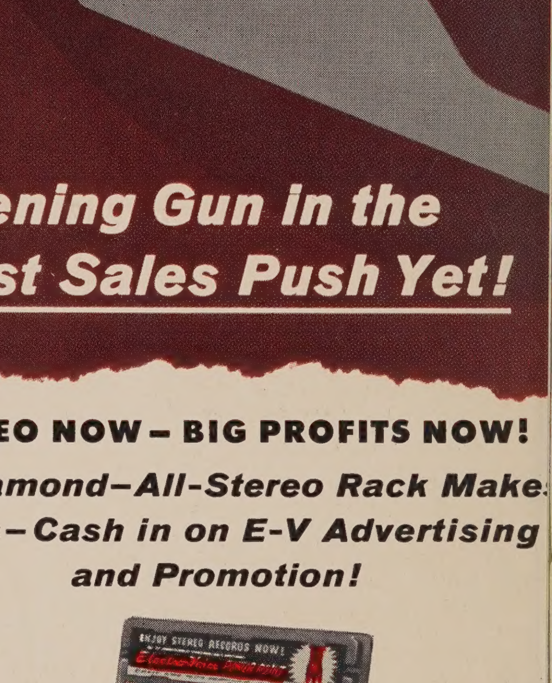
Everybody's selling E-V Stereo Power Points for STEREO CONVERSION, too. They're replacing old-style monaural cartridges or inferior cartridges—with one of these new E-V Stereo Power Points. It's easy, it's inexpensive, and each conversion assures a steady stream of replacement sales and PROFITS!

SO—GO E-V, the Power Point way—and listen to the music of your cash register! And remember, this is only the first of a series of promotions in this, E-V's biggest cartridge year!

*Power Point plug-in cartridges are an exclusive development of Electro-Voice, Inc., made under one or more of the following patents: 170,347; 2,793,254; 2,851,541; 2,842,610.

STEREO NOW – BIG PROFITS NOW!

All-Diamond–All-Stereo Rack Make Sales–Cash in on E-V Advertising and Promotion!



This special, all-diamond, all-stereo promotion is only th beginning!

This marks the start of the biggest year Electro-Voice ha ever had for big merchandising—big product news—all goo news for you!

Now—if you don't have the details on this opening gun pr motion—write Electro-Voice or ask your E-V Rep. You'll g good news!

EV®

ELECTRO-VOICE, INC., BUCHANAN, MICHIGA

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World's Largest Electronic Trade Circulation

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May, 1959

FRONT COVER A multitude of electronic parts and equipment, mutually dependent in a manner symbolized by an atomic structure, are classified in 13 major product categories of the 1959 Electronic Technician Buyers Directory starting on page 41 of this issue.

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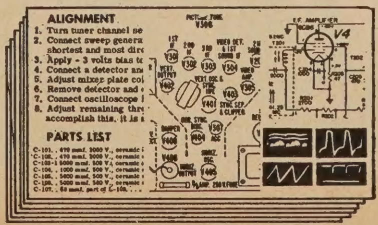
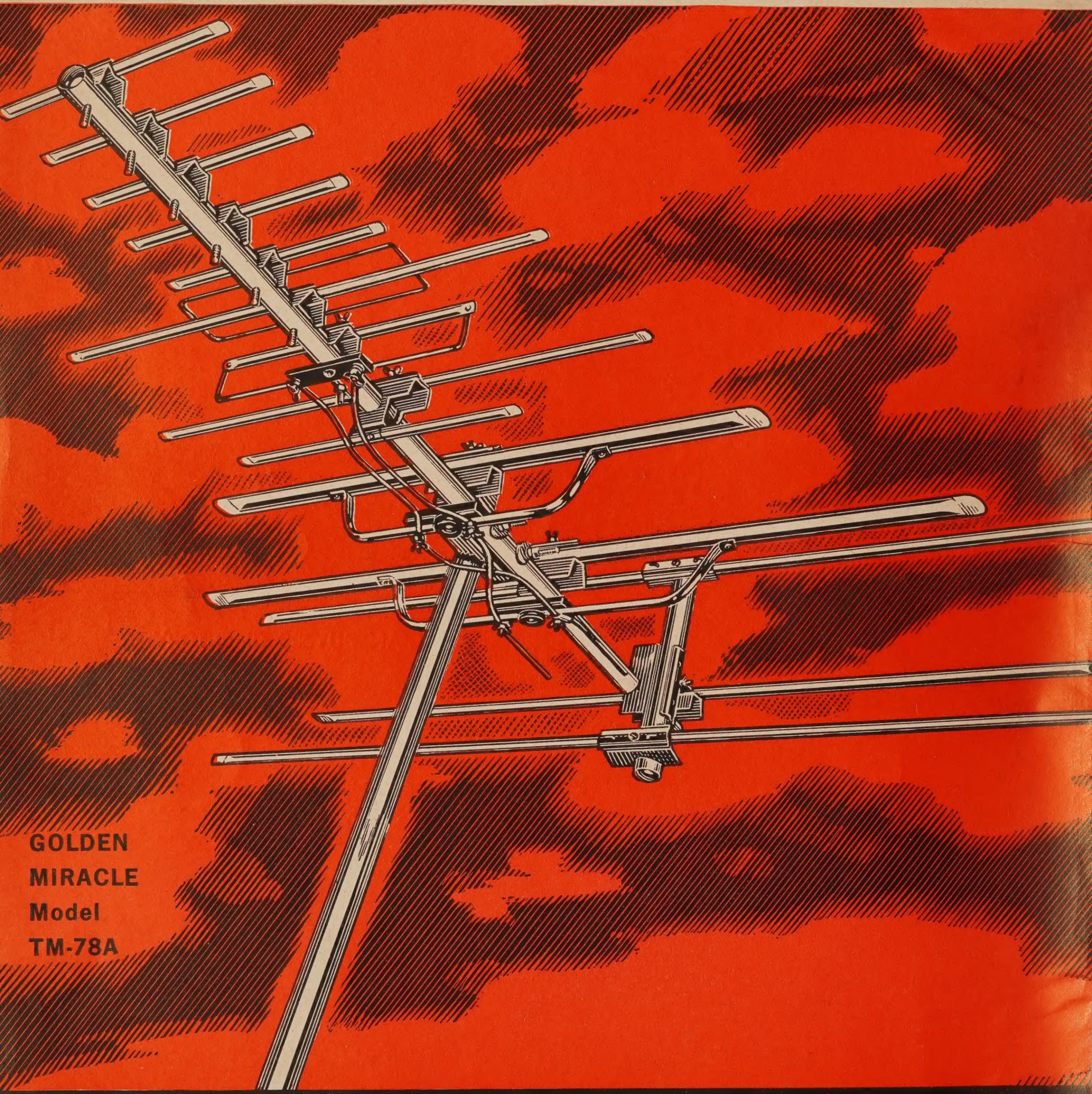


(16 pp. latest schematics—see last page)
GENERAL ELECTRIC: Transistor Radio Model P776A
MAGNAVOX: TV Chassis 74 Series
MOTOROLA: TV Chassis TS434
RCA: TV Chassis KCS118C, D
WESTINGHOUSE: TV Chassis V2374-1, V2374-2

It took years to create a Miracle... **but TENNA did it!**



GOLDEN MIRACLE Model TM-78A

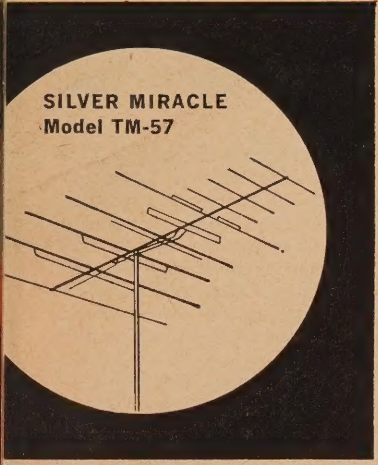
New *MIRACLE* Line of TENNA TV ANTENNAS

Gives you the exclusive, revolutionary and vastly superio

MIRACLE REFLECTOR SYSTE

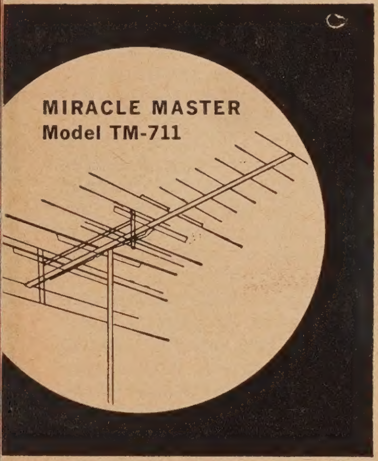
The greatest break-thru in picture reception since the inception of the first Yagi antenn

THERE IS A "CUT-CHANNEL" OR "ALL-CHANNEL" MIRACLE TO FIT EVERY POSSIBLE INSTALLATION NEED. TRY A "MIRACLE" IN YOUR MOST DIFFICULT RECEPTION AREA...MIRACLES ARE GUARANTEED TO PERFORM!



RED HOT PROMOTIONS TO ASSURE A MIRACLE IN SALES

Forceful, dynamic advertising, plus a wide array of sales promotional helps . . . the kind that makes 'em pause, think and buy!



RED HOT DEALS TO PROVIDE A MIRACLE IN PROFITS

Tenna is dealing from the hottest deck you ever saw . . . all stacked with royals and straight flushes. Every deal is a Blue Chip deal . . . and how you'll love 'em!

GET ON THE "MIRACLE" WAGON!

MIRACLE ANTENNAS ARE DESTINED TO BECOME AMERICA'S GREATEST SELLER!

Don't wait, don't put it off! A rare opportunity to multiply antenna sales is knocking at your door, be the first in your area to cash in on it . . . the Day of the Miracle is Here!

THE DAY OF THE "MIRACLE" IS HERE!

It took Tenna years to make the "MIRACLE", years of designing, engineering, testing, changing, proving, to give you the finest, most powerful antenna on the market today. The Miracle Reflector System makes the Miracle as different from ordinary antennas as a "prop" plane is to a jet. It's different, it's revolutionary and vastly superior . . . and it's yours to sell today!

- ★ Completely new from tip to toe . . . new in design and sensational in performance.
- ★ Exceedingly high front to back ratio assures greater picture clarity.
- ★ Highly directional, produces highest possible gain.
- ★ Superb all-aluminum construction with reinforced elements. Completely factory assembled with "quick rigging" that strengthens rather than weakens.
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- ★ Designed with color in mind . . . finest color reception.
- ★ Prevents co-channel interference from both back and sides . . . truly a phenomenon of science, a "miracle" in performance!

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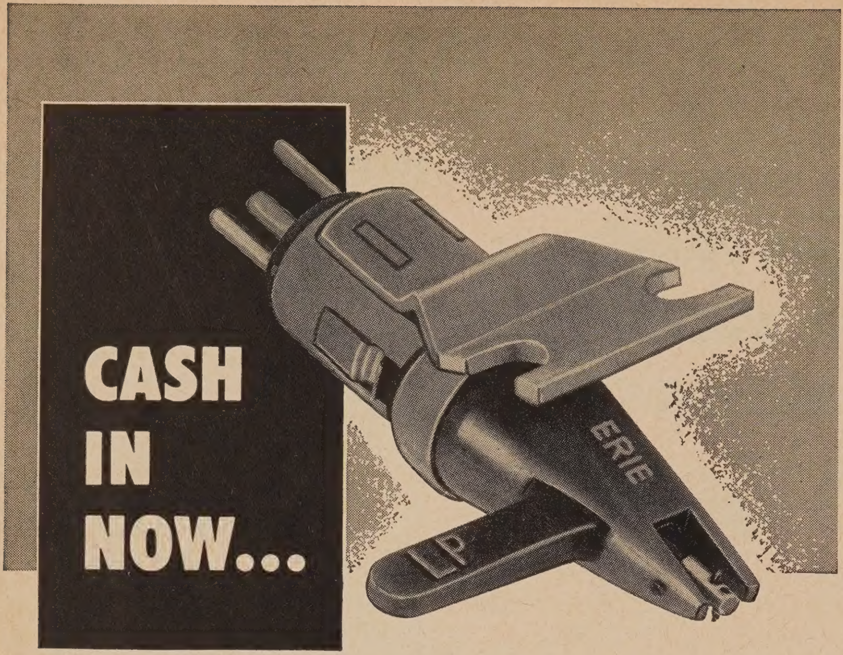
THE TENNA MANUFACTURING CO., CLEVELAND 25, OHIO



CASH IN NOW...

on Stereo conversions

NEW SINGLE-ELEMENT Stereophonic Cartridge by ERIE

Get your share of the good profits from converting monaural record players to stereo...recommend highest-quality ERIE "STERIEO" single-element cartridges.

Complete kits make for quick trouble-free plug-in of "STERIEO" cartridges. Choice of dual stylii—diamond-sapphire or sapphire-sapphire. Designed and made by Erie electronics leaders, with 30 years experience in industrial and military electronics.

In stock now at most ERIE Distributors. Or write us.

SPECIFICATIONS
Frequency response: 20 to 16,000 cycles
Tracking force: 5 grams
0.5v. output, each channel
20 DB channel separation

ERIE Electronics Distributor Division
ERIE RESISTOR CORPORATION
Erie, Pennsylvania

Editor's Memo

Mechanical devices will get the best of us if we don't watch out. I remember some years ago there was a picture in *Life* of a man beating his car with a baseball bat. It seems the vehicle had slipped into gear by itself, and refused to stop when the brakes were applied. In utter frustration, the owner could not restrain himself from giving it a few good whacks.

What technician has not felt like giving a tough dog on his bench a resounding smack or two. It may be a good outlet for irritation—but it's expensive. Better to use your energy in self-education through books, magazine articles and lectures. Many of the tough dogs will not be as difficult or frustrating.

Of course, improved equipment design can go a long way toward minimizing frayed nerves. Take the railroad designers. They couldn't open the windows when they stuck. So they designed railroad cars with windows that are sealed shut. It didn't turn out too badly—someone thought of adding air conditioning.

And the automobile field too. Someone wanted more power, so larger engines were installed. The heavier engine needed stronger support. Now it became harder to turn the steering wheel. So power steering was added. This took some of the engine's power, so a still larger engine was needed. And around we go.

By comparison, electronics has not done too poorly. TV sets are more compact, and some designers are starting to think of requirements for service accessibility. Transistor radios offer long battery life.

There is one story told of an electronic device that was too smart for its own good. A man invented a computer which, it was claimed, could answer any question put to it. A friend of the inventor doubted this ability, and decided to test it.

"My name is Joe Zilch, Jr.," said the doubter. "Where is my father?"

"Your father," answered the machine, "is fishing off Miami."

"You're wrong," claimed the man triumphantly. "I just spoke to Joe Zilch, Sr., just a few minutes ago. He's in San Francisco. Which just goes to show how much you know."

"Joe Zilch, Sr., is in San Francisco," boomed the machine. "Your father is fishing off Miami!"

Al Forman

after routing, clip and save

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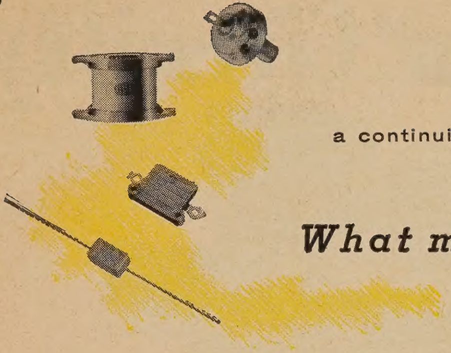
SANGAMO



a continuing series on technical topics relating to electronic applications

What makes mica the unique dielectric?

Mica is as old as the earth itself. Ancient Hindu writings show that mica was thought to be the remains of lightning flashes from which sparks had emanated and had become preserved in the earth. It was therefore regarded as being endowed with extraordinary properties, and was used in medical ritual. The replacement of such charming stories with modern technical knowledge has, however, not altered the fact that mica is endowed with extraordinary properties.

Mica is found in pegmatite rock, formed in the early stages of the cooling of the earth's mass. Crystals of mica were formed under high heat and pressure, and in the presence of moisture vapor and magnetic fields. The physical and chemical changes during this period served to impart a unique stability in physical, chemical and electrical properties. The chemical structure of mica is represented as $H_2KAl_3\ (SiO_4)_3$ which is Muscovite; India Ruby is one of the grades of exceptional quality and is used in most mica capacitors. Other types of mica, to name a few, are Phologopite, Lepidolite and Biotite, of which only Phologopite is of limited interest in experimental capacitors for very high temperature operation.

Mica is found in varying degrees of purity, some with less mineral or vegetable constituent, or stain, and some with more nearly perfect physical integrity — that is, free from cracks or air inclusions. As a result, raw mica must undergo careful physical examination and be graded according to quality and size. Sangamo has had over 35 years experience in the selection and processing of mica, together with a knowledge of mica capacitor production. Capacitor grades of mica film are generally obtained from the Bihar, Bengal, or Madras provinces of India. Mica for other purposes may be found in Canada, Brazil, Argentina, Madagascar, Africa, Russia, New Hampshire, South Carolina and South Dakota. This list is by no means complete. An idea of the magnitude of the task of selecting suitable mica can be obtained from the fact that only an estimated ten per cent of all the world's mica deposits are suitable for use in mica capacitors.

The earliest mica capacitor was probably made by Matteuci, a contemporary of Faraday's, about 1845. However, capacitors did not become commercially interesting until the advent of radio in the early years of this century, as a result of the growth of electrical technology. Both the electrical and electronics industries have depended significantly upon mica. Mica insulation between commutator segments in rotating machinery and the mica spacers in vacuum tubes are still vital to these industries.

In capacitors, the choice of dielectric material is as important as the method of construction. Mica, because of its sheet form, lends itself to stacked construction, resulting in a lower inductance assembly than can be obtained in wound capacitors. Mica capacitors are therefore suitable for very high frequency operation.

The mechanical or dimensional stability of mica allows blanking or die-cutting of dielectric plates to a desired size with only a very few thousandths of an inch variation. Precise assemblies may therefore be obtained and result in a greater ability to achieve accurate miniaturization. Electrodes may be permanently bonded to the mica dielectric plates by screening on conducting silver paste. This process has been refined to a high degree of accuracy, and results in superior electrical stability when compared to laying foil between mica plates to form the electrodes. Silvered mica capacitors exhibit exceptional stability in extremes of temperature.

The Q and dielectric constant (therefore, the capacitance) of mica change very little over wide ranges of frequency and temperature. Such small changes are due to the fact that the molecular structure of mica is essentially non-polar — that is, the molecules of mica do not have an unbalanced electrical charge. Thus they are not free to swing freely as magnets do (mica is practically non-magnetic) when in the presence of an electric field. Such fields are present when the capacitor is charged. Movement of the molecules would result in heating by the friction of their motion. Poor dielectrics exhibit considerable heating, as is shown by the heat developed in wood and glue in the process of laminating plywood in dielectric heating devices.

Heating effects may become very pronounced when high frequency alternating voltages are applied. The rapid changes in the direction of current flow cause polar molecules to literally vibrate about their rest position. The low heating of mica under such conditions is evidenced by the fact that certain types for transmitting applications will carry apparent currents to 50 amperes, at a few megacycles, resulting in only few degrees temperature rise.

Minimum dielectric heating is very essential since it has been shown that the life expectancy of a capacitor is reduced by a factor of approximately one-half for each ten degree centigrade rise in temperature.

All mica capacitors do not possess the ultimate characteristics of natural mica, since designs and manufacturing procedures differ according to original intent and application. However, the characteristics shown in the table could be realized under ideal conditions.

Characteristic	**Approximate or Ideal Value**
Dielectric Constant	7 (resulting in a moderate degree of miniaturization)
Q	3000 or greater
Power Factor	0.05% or less
Self Resonant Frequency	Up to 500 megacycles
Insulation Resistance	100,000 megohms or greater
Operating Temperatures	Up to 230°C. (85°C standard for commercial types)
Temperature Coefficient of Capacitance	0 to +70 parts per million per degree centigrade
Capacitance Drift or Capacitance Retrace	0.05% or less

At Sangamo all mica capacitors are designed and manufactured to exceed the physical and electrical requirements of applicable military specifications. The wide variety of Sangamo mica capacitor types allow flexibility of design and superior products for the most critical applications to meet individual specification requirements. Engineering catalog and bulletin giving full information on types and characteristics are available upon request for your examination.

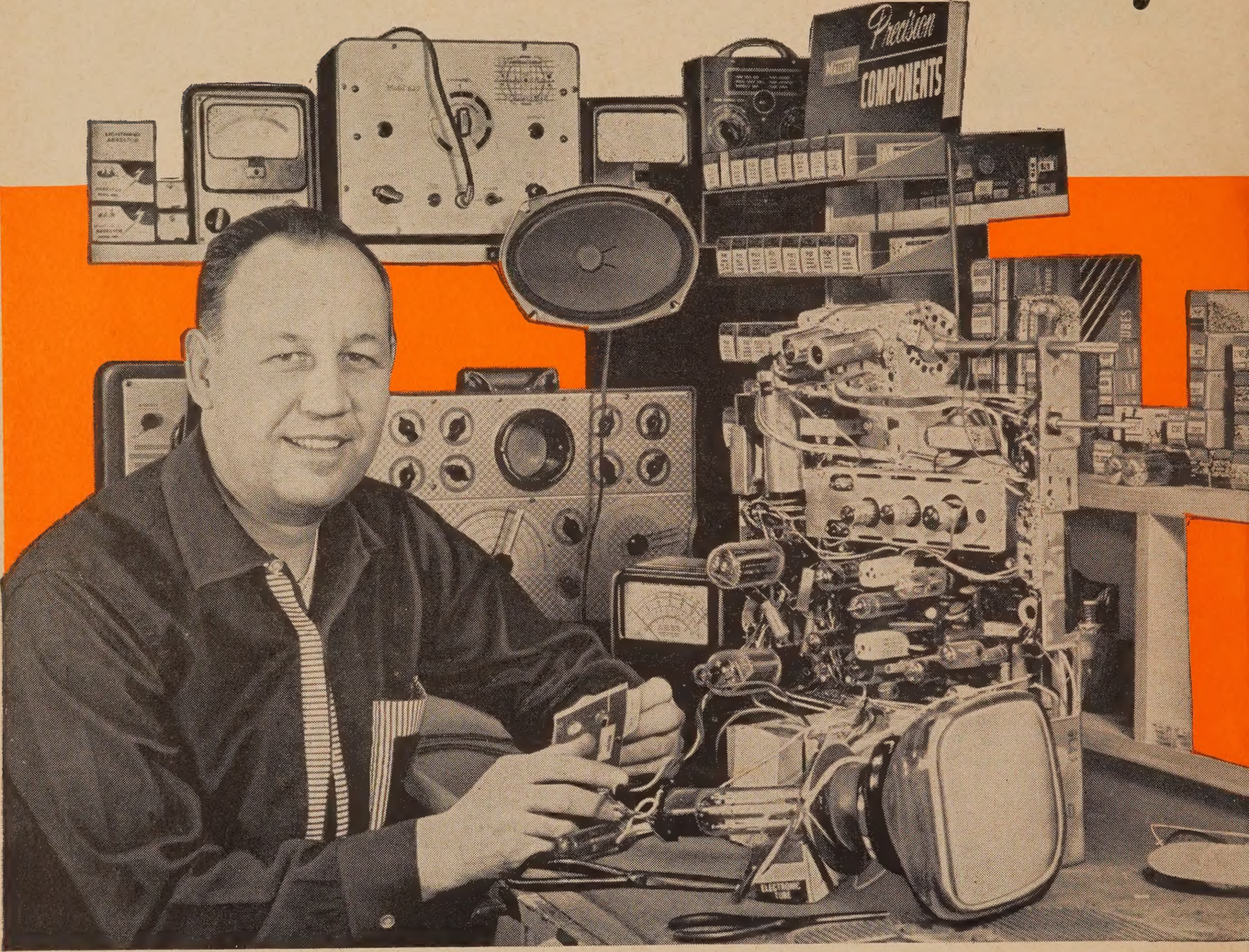
SC59-3

SANGAMO ELECTRIC COMPANY, Springfield, Illinois

--designing towards the promise of tomorrow

TV Technician TAYLOR THURMAN Explains . . .

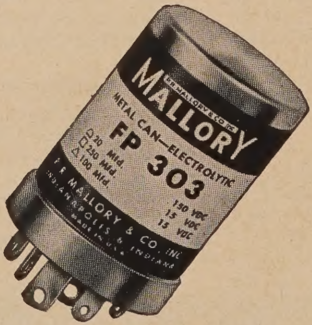
"In Precision Circuitry,


Precision
COMPONENTS

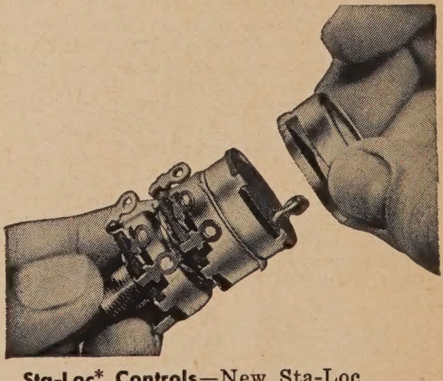
Stop Call-backs with these Quality Mallory Components

MALLORY
Precision
ELECTRONIC COMPONENTS
GEM-4022
$1.35

Gems—5 rugged, moistureproof, Mallory "Gem" tubular capacitors in an easy-to-use dispenser that keeps your stock fresh and clean—easy to find—no more kinks in lead wires. They're your best bet for outstanding service in buffer, by-pass or coupling applications.


MALLORY
METAL CAN—ELECTROLYTIC
FP 303
P. R. MALLORY & CO. INC.
INDIANAPOLIS, INDIANA

FP Electrolytics—The Mallory FP—the original 85°C capacitor—now has improved shock-resistant construction and leakproof seal. Its etched cathode construction—standard in all FP's—assures hum-free performance.



Sta-Loc* Controls—New Sta-Loc design enables your distributor to custom build, in just 30 seconds, over 38,000 combinations—eliminates waiting for out-of-stock controls. You can replace the line switch by itself, without unsoldering control connections.

There's Nothing Like Mallory RMC Discaps®"

"When it comes to replacing ceramic capacitors, we always use Mallory RMC Discaps. Time and again, they've proved dependable. For TV tuners and other precision circuitry the extra quality built into Mallory makes the difference between a satisfied customer and money losing call-backs."

When you're looking for high quality, sensibly priced components, check with Mallory. You get the widest selection of parts in the industry . . . and every Mallory component is service-engineered: your assurance that the parts you replace will be in service for a long, long time.

Taylor Thurman has operated his own TV repair service for more than 10 years. The Air Force gave him early training in electronics. At Scott Field, he became a Communications Chief. Later on, he attended the G.E. Television School in Syracuse. At his Richmond, Indiana, location, he now has two technicians helping him in radio and TV sales and service . . . operates two service trucks. Prompt attention to service calls and use of quality replacement parts are the chief factors to which Thurman attributes the steady growth of his business.

®Trademark of Radio Materials Co., a Division of P. R. Mallory & Co. Inc.

MALLORY
RMC
DISCAPS
ELECTRONIC COMPONENTS
MALLORY

Get your RMC Discaps—in the handy 3 x 5 file card five-pack—from convenient display at your Mallory distributor's store.

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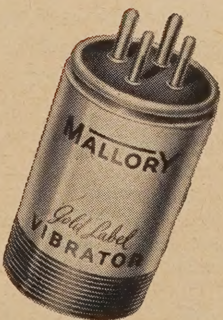
MALLORY
P. R. MALLORY & CO. Inc., INDIANAPOLIS 6, INDIANA

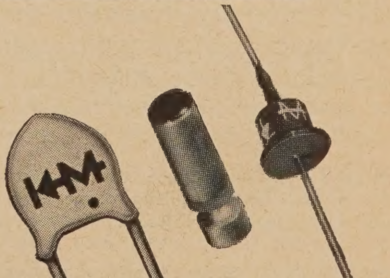
TC-36
25 MF. 50 V.
$1.26
PER PKG.

TC Tubular Electrolytic Capacitors—economically priced electrolytic filter capacitors with a reputation for doing an excellent job. They have been proved in performance and are backed by years of Mallory experience. Also special TCX type available for —55°C.



Gold Label* Vibrators—On critical auto radio servicing, use the Mallory Gold Label Vibrator. It gives longer, trouble-free service life. Mallory Gold Label Vibrators feature Mallory exclusive buttonless contact design.

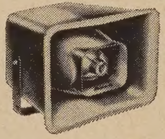
**Trademark*



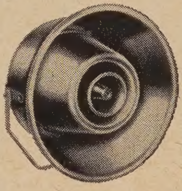
Silicon Rectifiers—New Mallory design gives far longer life, lower forward voltage drop, and reverse leakage current than conventional types . . . exceed the requirements of military humidity tests. In convenient kits for replacement of selenium rectifiers in radio and TV.

BACH
OR
BE-BOP
WHILE
YOU
BARBECUE

**On patio or parade ground . . .
for home or commercial use . . .
there's a University
weatherproof 'LC'
speaker system
designed to give you
clean, wide-range
high fidelity sound**


MODEL MLC

MODEL BLC


MODEL WLC

Only University gives you a choice of three *genuine* dual-range speakers (with separately driven woofer and tweeter) to cover any area you desire . . . wide or narrow, shallow or deep. Leave in place rain or shine, season after season . . . confident of their rugged dependability.

MODEL MLC — Compact, economical, exceptionally smooth tonal quality. Simply hook up to amplifier, phonograph, radio, or even TV. One-piece fiberglas reinforced polyester horn. 150-15,000 cps. 8 ohms. 15 watts. 12¾" x 9⅛" x 10⅝" deep. Shpg. wt., 10 lbs. *User net: $34.50.*

MODEL BLC — Meets the highest standards of the connoisseur. All metal construction. 70-15,000 cps. 8 ohms. 25 watts. Diameter: 22¾" Depth: 9¼". Shpg. wt., 21 lbs. *User net: $53.70.*

MODEL WLC — Finest outdoor system made. For full-bodied sound at higher output levels. All metal construction. 50-15,000 cps. 8 ohms. 30 watts. Diameter: 33½". Depth: 20". Shpg. wt., 72 lbs. *User net: $150.00.*

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University®

LETTERS
To the Editor

Boosts Booster Stand

Editor, Electronic Technician:

I want to compliment you on the very excellent job you did in the March Editor's Memo on illegal boosters. It is reprehensible that pressures by the inexpert politicians would tend to cause the FCC to reverse a decision made after several years of study. If the Commission backs down on this one, you might just as well throw out the Communications Act and disband the FCC, allowing the politicians to make the decisions in communications matters. We are grateful for your forthright approach.

Edward P. Whitney
Executive Director
National Community TV Assoc.
Washington, D.C.

. . . . I should like to compliment you for your editorial stand on the VHF booster problem. I thoroughly agree with your criticism of the "high pressure tactics" used by certain members of Congress in supporting violation of the law. Pressure upon FCC to reverse its decision does not solve this problem.

Daniel Aaron
Director of Public Relations
Jerrold Electronics Corp.
Philadelphia, Penna.

Knocks Booster Stand

Editor, Electronic Technician:

As former president of a company devoted to maintaining UHF translator TV facilities, it is my opinion that you were delirious when you wrote the March memo. Apparently you never asked yourself what people are supposed to do in a so called democratic republic when the governmental regulatory authorities act in an arbitrary way. The only FCC commissioner to make an on-the-spot investigation, Mr. T. A. M. Craven, said: "The Commission's first approach to this problem was precipitous, unduly rigorous, unrealistic and was based upon a narrow interpretation of the Communications Act." Apparently, the Commission did not recognize soon enough that these low-power boosters are the only practical way people residing in these isolated areas can secure TV service. It seems more appropriate to classify these boosters as limited radiation devices instead of broadcast stations.

J. Val Kruse
Cortez, Colo.

(Continued on page 10)

Silicon Rectifier... ...1N2078
1N2078
ts

NEW Tung-Sol 1N2078 designed and made for simple, speedy TV replacement!

Tung-Sol's new 1N2078 diffused junction silicon rectifier possesses distinct advantages the service industry will welcome. Optimum physical and electrical characteristics combine to make 1N2078 convenient to handle and install, and assure your TV and radio service customers the high-grade performance they want and appreciate.

Small size, easy to install. Tung-Sol's 1N2078 is smaller than most semiconductor devices, at no sacrifice in efficiency. Long flexible leads can be quickly soldered to existing connections with no additional hardware. This is especially suited to printed circuitry.

1N2078 Maximum ratings (100°C) capacitive load:
(Similar types available with Peak Inverse Voltages ranging from 50 up to 500)

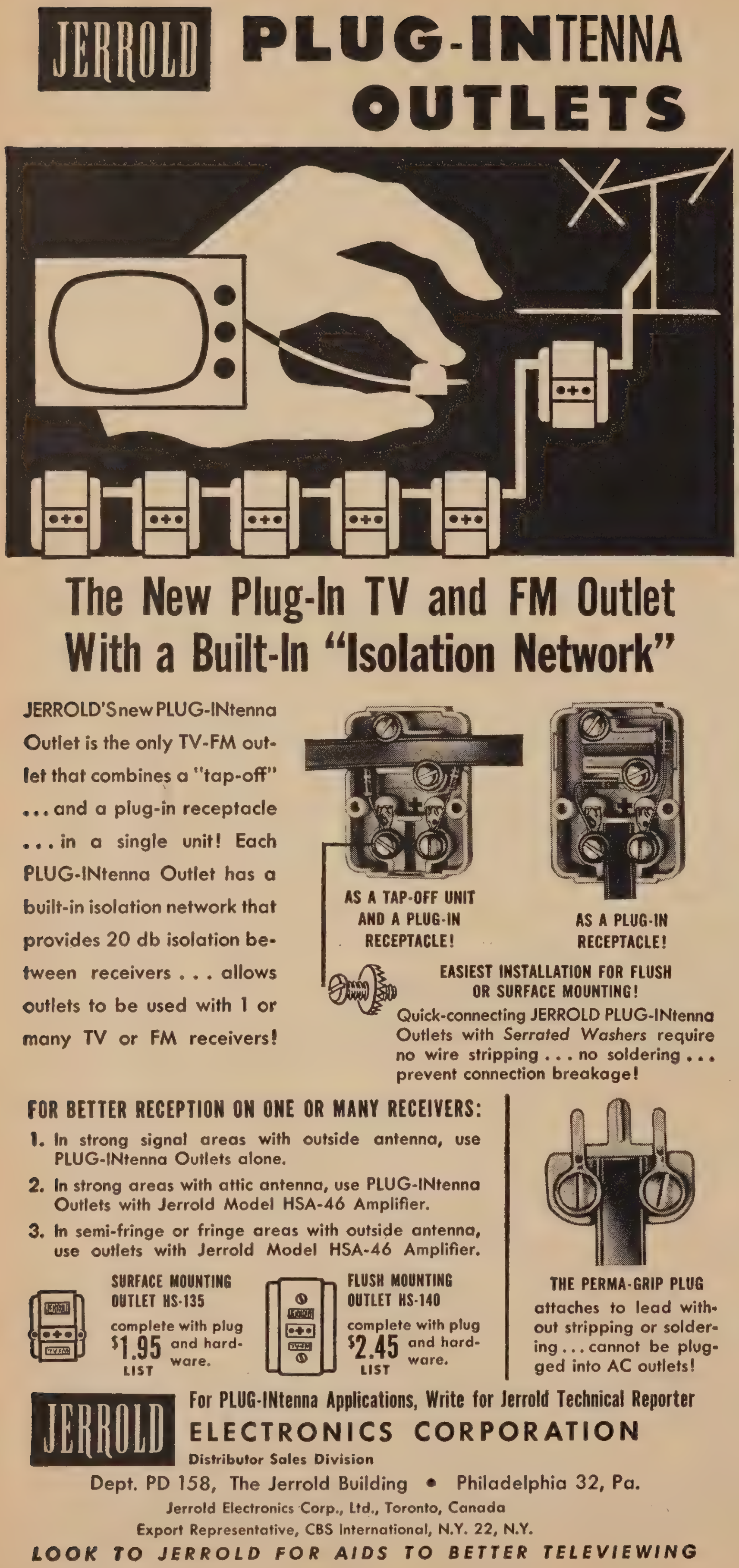
Peak Inverse Voltage	400 Volts
Continuous D. C. Reverse Working Voltage	400 Volts
Average D. C. Output Current	500 mAdc
Peak Recurrent Forward Current	5 Amps.
½ Cycle Surge Current	30 Amps.
Full Load Voltage Drop @ 25°C	1.1 Volts
RMS Input Voltage	130 Volts
Minimum Series Resistance (for capacitive filter)	5 ohms, 10 watt

Long life. Negligible voltage drop that remains stable over lengthy operation promotes long life. 1N2078 virtually unaffected by high current surges . . . maintains high B+ over full-length operation.

Special insulated case. Special case insulates against chassis shorts to further ease replacement. Also, 1N2078 dissipates its own heat . . . needs no heat sink . . . yet never requires derating. Only leads get hot.

You can replace any other device and, in some cases, rectifier tubes, with the new, high-quality Tung-Sol 1N2078. For complete information . . . to stock up, contact your distributor or: Tung-Sol Electric Inc., Newark 4, New Jersey.

ts TUNG-SOL®



JERROLD PLUG-INTENNA OUTLETS

The New Plug-In TV and FM Outlet With a Built-In "Isolation Network"

JERROLD'S new PLUG-INtenna Outlet is the only TV-FM outlet that combines a "tap-off" ... and a plug-in receptacle ... in a single unit! Each PLUG-INtenna Outlet has a built-in isolation network that provides 20 db isolation between receivers ... allows outlets to be used with 1 or many TV or FM receivers!

AS A TAP-OFF UNIT AND A PLUG-IN RECEPTACLE!

AS A PLUG-IN RECEPTACLE!

EASIEST INSTALLATION FOR FLUSH OR SURFACE MOUNTING!

Quick-connecting JERROLD PLUG-INtenna Outlets with *Serrated Washers* require no wire stripping ... no soldering ... prevent connection breakage!

FOR BETTER RECEPTION ON ONE OR MANY RECEIVERS:

1. In strong signal areas with outside antenna, use PLUG-INtenna Outlets alone.
2. In strong areas with attic antenna, use PLUG-INtenna Outlets with Jerrold Model HSA-46 Amplifier.
3. In semi-fringe or fringe areas with outside antenna, use outlets with Jerrold Model HSA-46 Amplifier.

SURFACE MOUNTING OUTLET HS-135
complete with plug and hardware.
$1.95 LIST

FLUSH MOUNTING OUTLET HS-140
complete with plug and hardware.
$2.45 LIST

THE PERMA-GRIP PLUG attaches to lead without stripping or soldering ... cannot be plugged into AC outlets!

For PLUG-INtenna Applications, Write for Jerrold Technical Reporter

JERROLD ELECTRONICS CORPORATION
Distributor Sales Division
Dept. PD 158, The Jerrold Building • Philadelphia 32, Pa.
Jerrold Electronics Corp., Ltd., Toronto, Canada
Export Representative, CBS International, N.Y. 22, N.Y.

LOOK TO JERROLD FOR AIDS TO BETTER TELEVIEWING

(Letters, Continued from page 8)

. . . . Sure you've sounded off on a subject about which you know all the facts? Looks like you've caught sight of one corner of a large controversy. These little UHF translators don't work out. Houses not facing the UHF translator don't receive it in the mountains. Even interference proved to be as bad as with VHF. VHF boosters cost $730 and blanket the area, compared to $10,000 for the UHF made by Adler. Even bucking FCC and going it illegal, over 400 boosters are going, with an estimated 1,500,000 viewers. You said that Congressmen applied the screws to FCC. Why the mean old things! They know that their constituents having their TV taken away from them by an unjust law will bring them home permanently come election time. You probably have your own reasons for wanting to butter up the FCC, and aren't interested in our problems out here.

LYMAN WATERS
Dolores, Colo.

• *We favor the spread of TV service wherever possible, but insist it be done in compliance with the law. Far from buttering up FCC—or anyone else—we severely criticized them in April 1958 for not enforcing the law against illegally radiating devices such as certain garage door operators. The FCC TV allocation plan mixing UHF and VHF in the same area has proved a dud, but imagine the havoc that would result if each station decided to use any frequency it pleased. Perhaps the booster problem is close to resolution. As we go to press, FCC has recommended that Congress change the law to legalize VHF boosters.—Ed.*

Accessible TV Sets

Editor, ELECTRONIC TECHNICIAN:

I would like to learn the opinions of service technicians concerning a patent that has been issued on an invention of mine: Means to Facilitate Repairs to TV and Radio Receiving Sets. [Essentially, the invention utilizes hinged cabinet panels to which chassis, picture tube and speaker are mounted. To gain rapid access to various components, the entire panel and chassis are swung out.]

PERCE CHRISTIANS
Sioux City, Iowa

Quick Schematics

Editor, ELECTRONIC TECHNICIAN:

I enjoy your magazine very much and wouldn't be without it. Many times I have gotten information out of Circuit Digests before the manufacturer sent us the diagram of a new set.

PAUL KLAVERWEIDEN
Huntington, N.Y.

(Continued on page 14)

The Old Frontier...

Burton Browne Advertising

...The New Frontiers

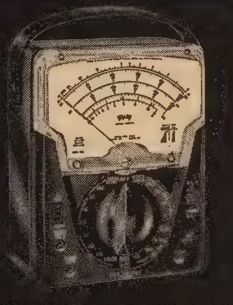
are in science, design, production

The new frontiers are being exploited by companies which like Triplett have worked the frontier of electronics for over 55 years.

Working the frontier means being on the spot with the equipment to develop and maintain this new made world. Triplett has a history of over 50 years of being first with the best in panel instruments and test equipment at a practical cost. Triplett is still working on the frontier of electronics with such innovations as these:

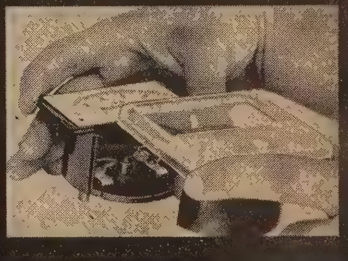
Over 55 years experience in instruments

Model 310 a complete miniature V-O-M with single switch selection and the ranges and accuracy of units several times its size. Used with Model 10 clamp-on ammeter plugged in it becomes one of the world's most versatile pieces of test equipment—even measuring current flow without stripping wires.



Model 630-PL V-O-M with such advanced features as an unbreakable clear plastic front for wide range, shadowless, instant vision, polarity reversing switch, single king size knob for selecting both range and circuit, continuous resistance readings from 0.1 ohm to 100 megohms.

Model 690-A, a new Transistor Tester with more Triplett "plus" in accuracy and simplicity, for testing leakage and gain of all low and medium power PNP and NPN transistors. Small, rugged, battery-operated, it measures DC Beta from 5 to infinity. Affords exact tests for shorts, checks forward & reverse leakage of diodes. Features single switch selection of transistor types, positive "off" to prevent accidental battery drain, separate "calibrate" and "gain" buttons eliminate errors, transistor socket and external leads for any basing arrangement.

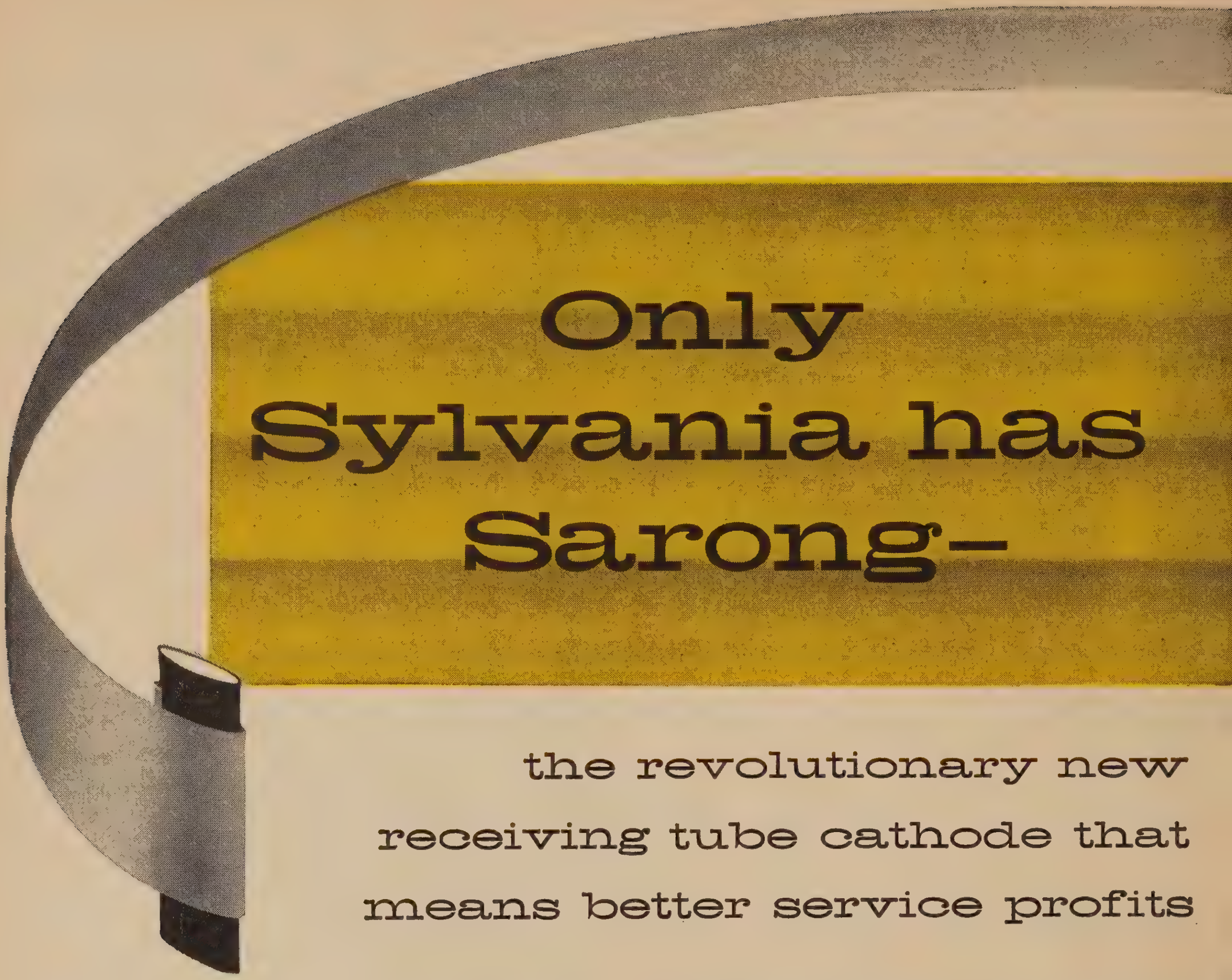


New Unimeters—a great step forward in increasing meter inventory flexibility while cutting inventory cost. These Select-Your-Range unimeters consist of only two basic meter movements, which can be combined with any one of a number of separate dial-component units for a wide variety of meter ranges. Movements quickly and simply slide onto dial-components and lock together—no soldering, no wiring. Exclusive Triplett Bar-Ring construction for self-shielding, greater accuracy and sensitivity.

TRIPLETT

Triplett Electrical
Instrument Company
Bluffton, Ohio

Throughout the world Triplett first . . . to last



Only Sylvania has Sarong–

the revolutionary new receiving tube cathode that means better service profits

Fewer call-backs due to intermittents and shorts . . . reduced noise and less arcing . . . these are some of the benefits available to you *now* with this "can't be copied" Sylvania development.

The Sarong cathode is a completely new development that transforms conventional sprayed cathode coating into a thin uniform film, precision-wrapped and securely bonded, around each cathode sleeve.

Now in use in nearly 1 million receiving tubes, Sylvania Sarong is a field-proven development setting new standards of efficiency and quality in electron tube performance.

First tubes to incorporate Sarong are tv tuner types 6BZ7, 6BQ7A, 6BC8 and 6BS8. Eventually Sarong cathodes will be utilized in the full line of Sylvania receiving tubes.

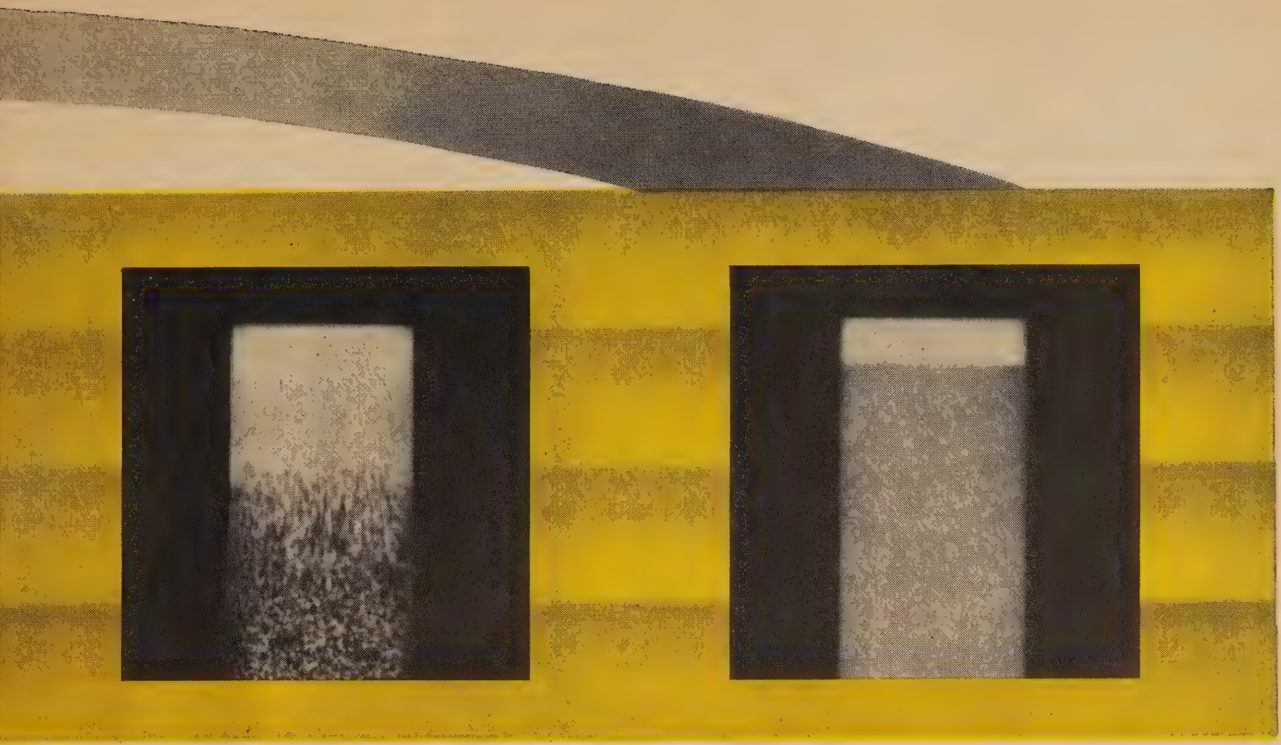
Here are some of the reasons why it will pay you to replace with Sylvania Sarong cathode tubes:

- Reduced noise . . . uniformity in spacing has resulted in improved noise level up to 0.6 db for TV frequencies.

SYLVANIA

Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM



Inherent physical superiority of Sylvania's exclusive Sarong cathode, right, over a conventional cathode, left, is evident in this photomicrograph comparison. The texture, thickness, sharp coating edges and overall uniformity of Sarong represent major improvements in the heart of the electron tube never before achieved in mass production.

- Less heater-cathode leakage . . . Sarong is flake-resistant and smooth textured. No stray coating particles to stick inside cathode.
- Greater tube ruggedness against shock and vibration because of Sarong's superior coating adhesion.
- Reduced cathode-grid shorts intermittent short circuits, and less arcing due to controlled uniformity of Sarong thickness. Sarong cathode coating is held to thickness tolerances five times closer than conventional sprayed cathode coating.

Sylvania Sarong will help you make better profits through reductions in call-backs. See your Sylvania distributor today for the full story on Sarong—available *only* from Sylvania.

6BZ7
6BQ7A
6BC8
6BS8
SYLVANIA
SYLVANIA
ELECTRONIC TUBE
MADE IN U.S.A.
6BS8
SYLVANIA

Sarong cathodes are now in use in these Sylvania tv tuner types. Eventually all Sylvania receiving tubes will contain Sarong cathodes.

Sylvania Electric Products Inc.
1740 Broadway, New York 19, N. Y.
In Canada: P. O. Box 1190, Station "O," Montreal 9

STANDARD OF COMPARISON
RADIART
VIBRATOR
TYPE
5301
BASE CIRCUIT
A
INPUT VOLTAGE
6

The Greater Vibrator

Radiart Vibrators are unaffected by bounce, jounce, heat, cold, moisture. There's a replacement type for every 6- and 12-volt application. Ask your Radiart Distributor for a free Radiart Vibrator Replacement Guide or write The Radiart Corporation, 2900 Columbia Avenue, Indianapolis 5, Indiana.

RADIART
TOBE
Vibrators

(Letters, Continued from page 10)

Certification Cost

Editor, Electronic Technician:

I have had subscriptions to four other technical magazines, but I have not enjoyed them half as much as I do yours, the real spokesman for the nation's service technicians. Your March article on New York's "Proposed Legislation to Test and Certify TV Technicians" is the best plan proposed so far. But why the high $25 fee? I do not think that is fair. Let the state do what the Federal Government does—give FCC exams free. If New York's plan goes through, eventually the rest of the states will do the same.

Louis Montoya
Los Angeles, Calif.

• *This legislation was not acted upon at this session, but the Attorney General's office is optimistic about passage when the Legislature meets again. The $25 fee is unfortunate, but it appears the economy-minded legislators will kill any bill that is not self-supporting.—Ed.*

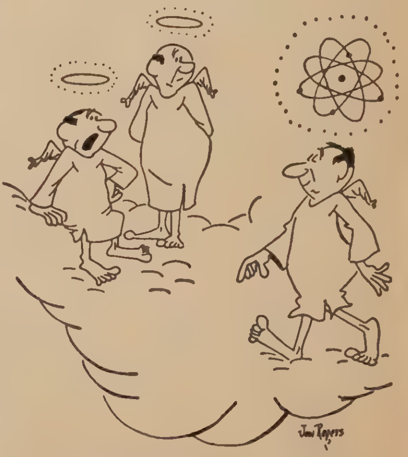
Printed Help

Editor, Electronic Technician:

We appreciate your editorial on the problem of in-home estimates, but let's carry it a step further. In most cases, the technicians must sell the shop repair to the customer before removing the set. We can do this 9 out of 10 times, but how much easier it might be if we had some printed matter under an authoritative letterhead to leave with the customer, explaining why it is difficult to give an exact estimate of repairs. Such an article addressed to the general public would be a great help to independents.

J. P. Schaming
Schaming Service
Pittsburgh, Penna.

• *Many thanks for the excellent suggestion. See page 40 for just such an article. Extra copies are available at moderate cost.—Ed.*



"I understand he was an electronic technician."

REK-O-KUT TABLE TALK

Rek-O-Kut Co., Inc., 38-19 108th St., Corona 68, N. Y.

First name in quality turntables and tonearms.

FOR PROBLEM-FREE STEREO . . . REK-O-KUT STEREOTABLES

Engineering Perfection of Full Rek-O-Kut Line Eliminates Costly Callbacks, Assures Customer Satisfaction

Single-Speed in Kit Form—$49.95

SPECIFICATIONS Model K-33H

Assembly Time: Approximately 30 minutes with simple tools. Mounting template supplied

Noise Level: —52 db.

Motor: Hysteresis Synchronous.

Speed: 33⅓ rpm.

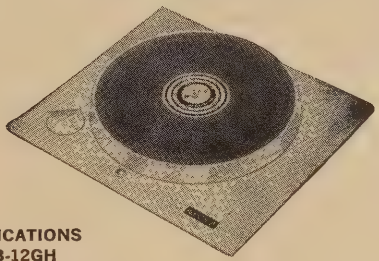
Belt: Special endless woven fabric with thickness held to ± .001. Adjustment for belt tension.

Built-In Strobe Disc: For checking speed.

Minimum Dimensions For Cabinet Installation With Rek-O-Kut S-120 Arm: 17¾ x 16⅜.

Model K-33: 4-pole induction motor. **$39.95.**

3-speed Hysteresis Synchronous Motor—$99.95



SPECIFICATIONS
Model B-12GH

Noise Level: —53 db.

Motor: New design, self-lubricating, Hysteresis Synchronous.

Speeds: 33⅓, 45 and 78 rpm.

Speed Selection: Single selector knob. Idler is disengaged in "off" position.

Built-In Strobe Disc: For checking speeds.

45 RPM Hub: Built-in retractable.

Pilot Light: Jewelled neon light acts as "on/off" indicator.

Chassis Deck: Cross-ribbed cast aluminum. Designed for flush-mounting in rectangular cut-out.

Minimum Dimensions For Cabinet Installation With Rek-O-Kut S-120 Arm: Left to Right 17¾; Front to Back 16"; Height above Deck 3"; Height below Deck 6½".

Turntable: Solid cast aluminum—lathe-turned. Tapered for easy disc handling.

Single-Speed Hysteresis Synchronous Motor—$69.95

SPECIFICATIONS **Model N-33H**

Noise Level: —53 db.

Motor: New design, self-lubricating, Hysteresis Synchronous with special breaking for reduction of coasting.

Speed: 33⅓ rpm.

Belt: Special endless woven fabric with thickness held to ± .001. Adjustment for belt tension.

Built-In Strobe Disc: For checking speed.

Chassis Deck: 15⅞ x 15 Aluminum

Minimum Dimensions For Cabinet Installation With Rek-O-Kut S-120 Arm: 17¾ x 16⅜.

Turntable: Solid Cast Aluminum lathe-turned. Tapered for easy disc handling.

All-New Rondines Offer Matchless Performance—Fashion-Keyed Styling!

With the new advanced StereoTables, Rek-O-Kut has again set performance standards far beyond any consistent attainment by other brands! In addition to great new operational performance and convenience, Rek-O-Kut has added fashion-keyed styling with striking designs created by *George Nelson, noted industrial designer.* The lathe-turned cast-aluminum tables are now tapered for easy disc handling and the compact, modern over-all turntable decor is highlighted by the attractive finish in black and aluminum.

The K-33H belt-drive StereoTable in kit form answers the tremendous demand by the budget-conscious "teenage," and college groups, as well as the "do-it-yourself" fans. Even with a Rek-O-Kut or Audax Tonearm Kit, the K-33H matches or betters the price of "High Fidelity" changers! Simple assembly with ordinary tools can be accomplished in less than thirty minutes!

Owners and buyers of more elaborate stereo component systems will welcome the advent of the single speed and *3-speed StereoTables with hysteresis synchoronous motors at unprecedented low prices.* This broad selection is further widened by the continued availability of the famous Rondine Deluxe (B-12H) with custom hysteresis motor and the ever-popular 2-speed Rondine Juniors (L-34) and L-37).

SEND FOR NEW CAT. and "WHY TURNTABLES ARE A MUST FOR STEREO."
Name ....
Co. ....
City ....
Zone .... **State** ....

MEMBER
INSTITUTE OF
HIGH FIDELITY
MANUFACTURERS
INC.

ENGINEERED FOR THE STUDIO
. . . DESIGNED FOR THE HOME

Export. Morhan Exporting Corp., 458 Broadway, N. Y. 13
Canada: Atlas Radio Corp. 50 Wingold Ave., Toronto 10, Ont.

a real sweet combination...
the new
FASTATCH FDK-100
Dual Control Kit

with the
Centralab® SK-2
Shaft-Kut Tool
FREE!

If you have a birthday *any time this year,* CENTRALAB has a present for you NOW . . . a real money-saving offer that gives you a $41.90 value for only $32.70.

This $9.20 saving is yours when you buy the new CENTRALAB Fastatch FDK-100 Dual Control Kit and SK-2 Shaft-Kut Tool combination. The handy kit contains 24 controls and 9 switches—that let you quickly snap together any of 720 different dual control combinations.

The Shaft-Kut Tool assures you of *precise* control or switch shaft length . . . accurate to 1/64th of an inch. It is available separately, at $4.95, actually less than half the price you would expect to pay for it.

So don't waste any more time with special trips to your distributor when you need a dual-concentric. Have the control you need at your fingertips with this wonderful kit-and-tool combination. But don't delay . . . *this money-saving offer is for a limited time only!*

HERE'S WHAT YOU GET	REGULAR PRICE
24 controls and 9 switches all factory assembled and tested	$32.70
Sturdy steel cabinet	4.25
Shaft-Kut Tool	4.95
Actual value	$41.90

You get all this for $32.70—the cost of the controls alone! The Shaft-Kut Tool and steel cabinet are FREE!

Centralab
B-5940

A DIVISION OF GLOBE-UNION, INC.
902 E. KEEFE AVE. • MILWAUKEE 1, WIS.
IN CANADA: 669 Bayview Ave., Toronto 11, Ont.

CONTROLS • ROTARY SWITCHES • CERAMIC CAPACITORS
PACKAGED ELECTRONIC CIRCUITS • ENGINEERED CERAMICS

News of the Industry

TUNG-SOL ELECTRIC, INC. has appointed JACK W. SERIFF as Mgr. of the Central O.E.M. Sales Region.

ITT CORP. has appointed Roy OLERUD as Sales Administrator of the Components Div., Clifton, N. J.

ALLEN B. DU MONT LABS., INC. has named KENNETH F. PETERSEN Mktg. Mgr. of the Industrial Electronics Div.

UNITED MOTORS SERVICE, Div GMC announced the appointment of WALTER S. FORTNEY as Gen. Service Mgr.

VOCALINE CO. of AMERICA, INC. reports the appointment of RALPH C. ROUTSONG, JR. to their Consumer Product Sales Div.

SONOTONE CORP. has expanded its line of military, commercial and entertainment tubes to approximately 100 types, both miniature and subminiature.

SERVICE INSTRUMENTS CORP. has produced a sound film, "The Sencore Time Saver Story," available to distributors from the local SENCORE rep.

PHILCO CORP. has appointed MAURICE G. PAUL JR. to head the newly established Distributor-Dealer Development Dept. for the Marketing Div.

WORKMAN TV., INC. announces a contest for distributors and retailers. Official entry forms are available from distributors between April 15 and Oct. 15, 1959. Entries must describe in 10 words or less why the user likes the firm's products. Volkswagon trucks will be awarded.

RAYTHEON MFG. CO. announces the following appointments: GEORGE LOOMIS, Mgr. of Receiving Tube Div., and RAY V. MC CADAM, Mgr. of Equipment Tube Sales for the Industrial Tube Div. The firm has been awarded the honor plaque for distinguished service in 1958 by the Federation of TV-Radio Service Assns. of Pa.

P. R. MALLORY & CO., INC. has formed the Elkon Div. consisting of an Electromagnetic Dept. and a Semiconductor Dept., headquarters at Du Quoin, Ill., with the following appointments: KENNETH M. SCHAFER, Gen. Mgr.; L. J. HEMELGARN, controller; FRED H. LARRABEE, JR., Sales Mgr.; L. B. WHISLER, Factory Mgr., RALPH W. MEYER, Purchasing Agent. A. B. TOLLEFSEN, JR. is Ch. Engr. of the Electromagnetic Dept. ROBERT F. FORBES and JAMES M. HALL are Mgr. and Ch. Engr. respectively of the Semiconductor Dept.

(Continued on page 18)

Frank—
Better c
read: "more
Pound". Th
are moving
to make l
both jobbe

These new Utah speakers were inspired by the fabulous new Boeing 707 Jet Airliner, now streaking coast to coast in just 4½ hours! Utah speakers, *too*, pack more power per pound, feature Jet Airliner slim-line design to meet modern demands for more compact Stereo and High Fidelity applications.

speakers

. . . Never before such *concentrated power!* The secret is in Utah's brand new dual-diameter magnetic circuitry and dynamic Uni-coils. By ingeniously combining two magnetic material structures into one, Utah has produced the greatest power per pound in a loud-speaker since the advent of Alnico V. See the all new Utah speakers now—8″ full range model **D8LA** and 12″ full range model **D12LA**—they're as "hot" as a Jet Airliner! On display at the Show. Booth 587.

utah
SPEAKERS

Utah Radio & Electronic Corp., Huntington, Ind.

inued from page 16)

O. announces a promotion
TV servicemen to intro-
te Box Line (6 models).
emiums free with every
mailer.

LEPHONE SUPPLY
td INTERNATIONAL
). its sales agent for
controls marketed
s. IRC's foreign li-
the manufacture of
ors. CTS has pur-
ate IRC's variable
ng plant in Ashe-
of the replacement
rovided by adding
nal equipment con-
o and auto sets to

P. announces the ap-
ANK B. POWERS,
and Dir. of the Corp.

IC CORP. has opened
22 Yukon Ave., Haw-
ch will be their west
rs, formerly at Los

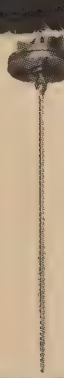
DUCTS CO. has
cturing facilities to
under the direction
EMAN, Vice Pres.

announced the fol-
and appointments:
ENGEE, Equipment
ceiving tubes; GEORGE
r. Product Planning;
MPY, Mgr. Mktg. Re-
ouis H. Niemann, Sales
uctor operations.

P. OF AMERICA elected
H. BROWN, Vice Pres.
nd JACK S. BELDON,
Gen'l Mgr. Home In-
R. OZSVATH was pro-
r., Merchandising, Mkt.
ceiving Tubes of the Elec-
iv.

NERAL ELECTRIC CO. announced the combination of its Technical Products Dept. of Syracuse, N. Y. and its Communication Products Dept. of Lynchburg, Va. in a single communications organization, the Communication Products Dept., to be headed by HARRISON VAN AKEN. WILLIAM J. MORLOCK was named Consulting Engineer for the Industrial Electronics Div. and I. L. GRIFFIN was appointed Mktg. Mgr. for the TV Receiver Dept.

"Hey Chief, stand in the center and hear this effect."



PT5 SILICON RECTIFIERS

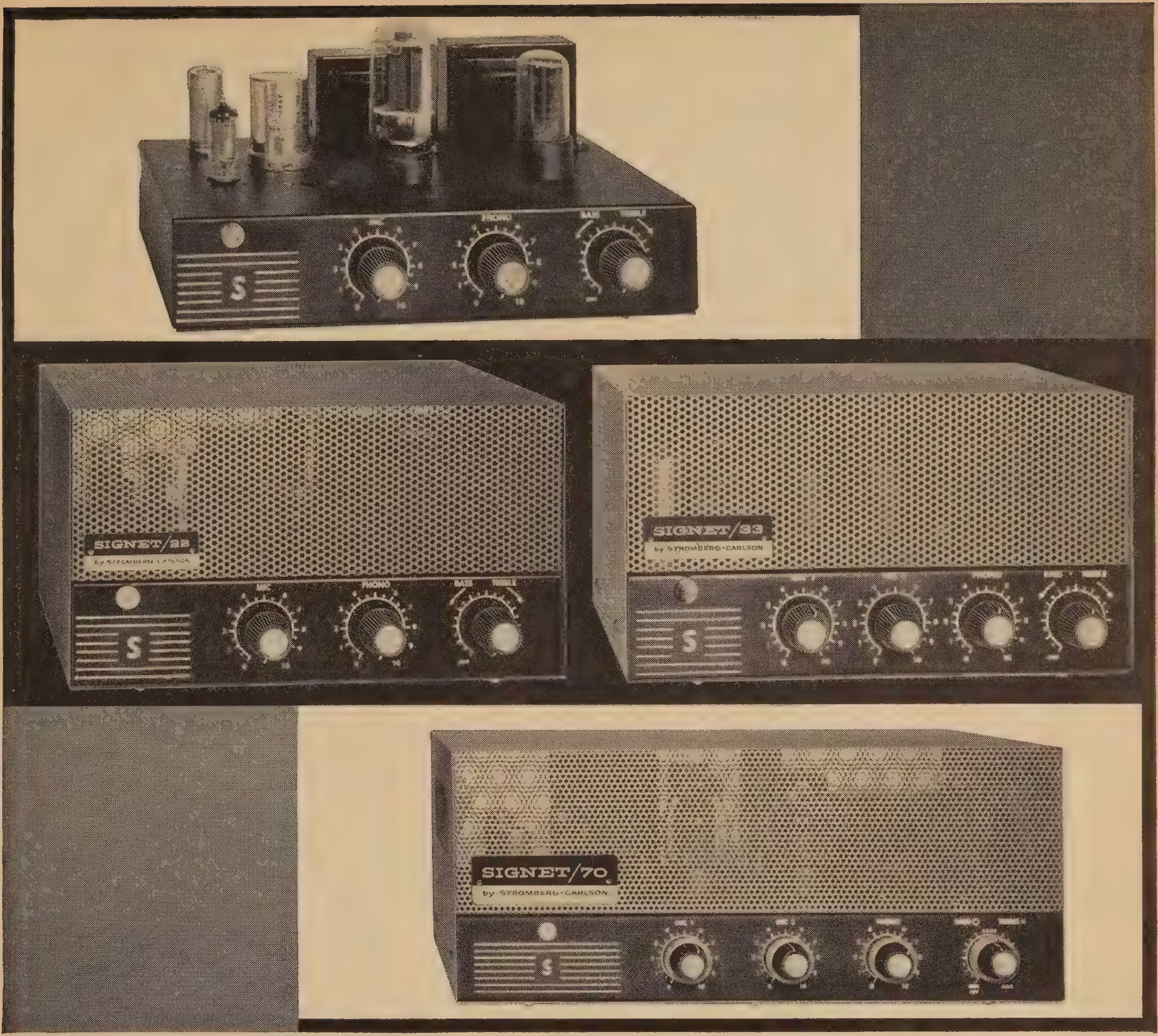
the universal replacement preferred by TV set manufacturers

Cut down expensive inventory, eliminate intricate installations — install the Automatic PT5 for top performance and maximum picture brightness!

GI

GENERAL INSTRUMENT DISTRIBUTOR DIVISION
240 Wythe Avenue, Brooklyn 11, N. Y., EVergreen 8-6000

See us in Chicago at the Electronic Parts Distributor Show—Booth 590



NEW SOURCE OF PROFIT FOR YOU:

"Signet" Amplifiers...from new line of sound equipment

BY STROMBERG-CARLSON

These amplifiers by Stromberg-Carlson are priced to *sell* faster . . . engineered to *perform* better . . . built to *last* longer, feature new simplified wiring!

Our "Signet" series, available in 10-watt, 22-watt, 33-watt and 70-watt models, offers many advantages to a wide range of users. Here are a few main features:

- Frequency response of 20-20,000 cps
- Greater sensitivity
- Continuously variable tone control for greater flexibility
- Separate bass and treble controls on two models
- Unique push-pull output stage that reduces distortion . . . provides full-frequency feedback and improved transient response
- Simple, rugged chassis that performs equally well indoors or out

This new line of amplifiers is one more example of Stromberg-Carlson's forward-looking operation that offers you more opportunity for profit.

Call, wire or write for specs and ordering information.

"There is nothing finer than a Stromberg-Carlson"

STROMBERG-CARLSON A DIVISION OF GENERAL DYNAMICS CORPORATION
SPECIAL PRODUCTS DIVISION • ELECTRONICS CENTER • 1461 N. GOODMAN ST., ROCHESTER 3, N. Y.
SEE US AT THE PARTS SHOW • ROOMS 515 AND 517A

HERE'S THE BEST

AEROFILM
V84C4P5
.5 MFD

Bypass Capacitor you can use!

AEROVOX TYPE V84C

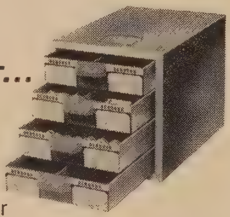
**Aerofilm (†Mylar) Tubulars*

The best bypass capacitor on the market today at a price no higher than conventional units. All the technical advantages of Mylar dielectric, so widely used in premium-priced capacitors, are yours in a superior bypass tubular that virtually eliminates call-backs. Combining performance-proved, humidity resistant white ceramic cases with Mylar dielectric makes these capacitors superior to anything previously offered. These remarkable units will stand-up in those high humidity areas where other types have failed!

Only Aerovox Type V84C gives you these plus features...

SMALLER SIZES than conventional tubulars.
85°C 150°C operating temperatures (with voltage derating).
LOW DIELECTRIC ABSORPTION, lower than oil-impregnated types.
OUTSTANDING STABILITY, little temperature change over normal operating range.
HIGHEST INSULATION RESISTANCE
PREMIUM QUALITY at prices no higher than conventional units.

BUY 'EM BY THE KIT...



two Mylar Tubular Kits (AK-100 & AK-101HS) in handsome 4-drawer metal cabinets are now available at your local Aerovox Distributor. Buy the capacitor assortment kit and get the cabinet FREE!

* Aerovox trademark † DuPont trademark

AEROVOX CORPORATION
DISTRIBUTOR DIVISION
NEW BEDFORD, MASS.

Catalogs & Bulletins

TUBES: Receiving, TV and special purpose tubes are listed by type number with prices in a new electron tube directory. Contains most every tube made by American manufacturers. Metropolitan Supply Co., 1133 Broadway, New York 10, N.Y. (ELECTRONIC TECHNICIAN B5-10)

WIRE: ZK-4 is a new one-page wire stranding chart for determining available stranding combinations for various sizes of conductor wire. It also shows the number of smaller gauge wires necessary to make up the cross-sectional area of a conductor. Alpha Wire Corp., 200 Varick St., New York 14, N. Y. (ELECTRONIC TECHNICIAN B5-1)

RECTIFIERS: Preliminary bulletin PB-54 describes a new heavy-duty silicon rectifier. This stud-mounted unit features a high-current rating of 35 amperes @ 150 degrees centigrade case temperature. Transitron Electronic Corp. Wakefield, Mass. (ELECTRONIC TECHNICIAN B5-8)

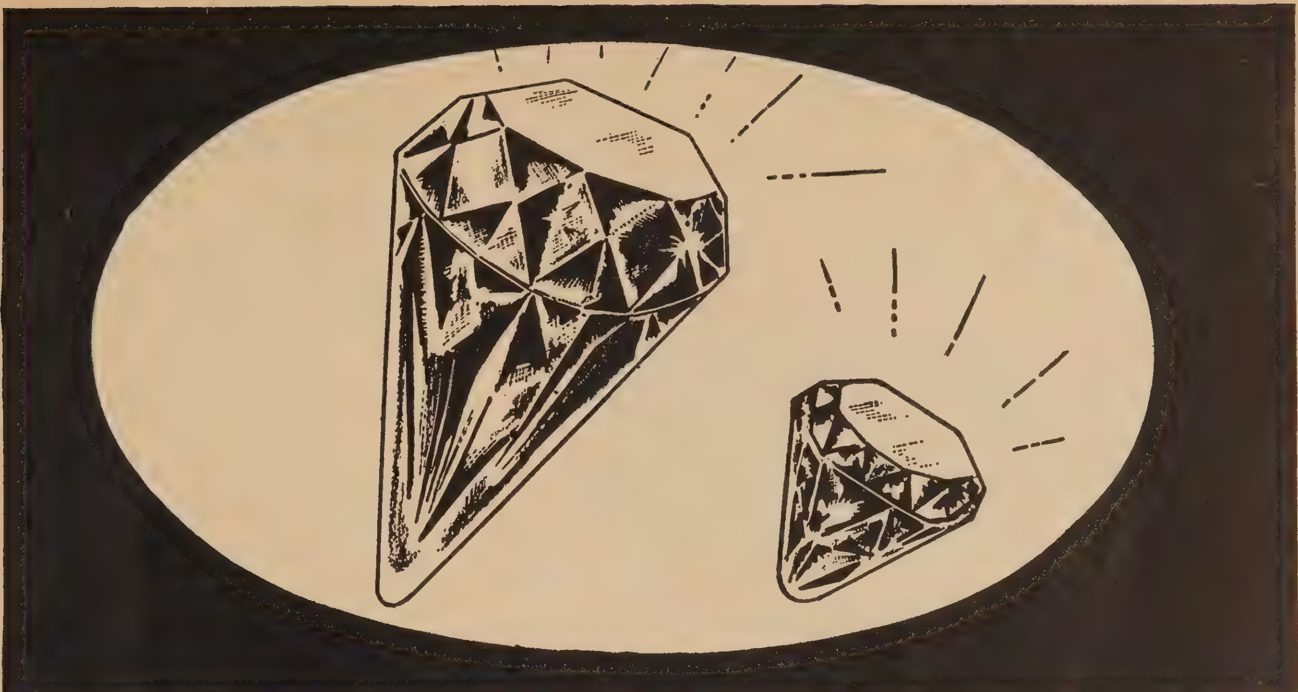
TUBES: Nearly 800 tube types are listed in a 12-page tube chart in a plastic binding which provides for the addition of new pages It will be furnished with each new tester, models V11, V12, V100 and V1002. Present owners of these and other models may buy the book at $1.00 per copy. Order direct from Vis-U-All Products Co., 303 Fuller Ave., N. E., Grand Rapids, Mich.

DIGITAL INSTRUMENTS: A 4-page illustrated bulletin, catalog 19-36, describes the firm's complete line of digital instruments which include voltmeters, ratiometers, ohmeters, preamplifiers, input scanners, and a variety of accessories. Kin Tel Div., Cohu Electronics, Inc., Box 623, San Diego 12, Calif. (ELECTRONIC TECHNICIAN B5-6)

RELAYS: A new 16-page catalog features basic general purpose relays, ranging from small multi-contact midgets to sensitive, heavy duty, medium power and power types. Includes: dimentional drawings; available contact arrangements; current and coil operating speeds; terminals; weights, etc. Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill. (ELECTRONIC TECHNICIAN B5-4)

TAPE RECORDERS: A colorful 6-page illustrated brochure describes the firm's latest transistorized, battery-operated, spring-motor portable tape recorders designed for field applications. Recording characteristics, technical specifications, recommended accessories and prices are included. Amplifier Corp. of America, TransMagnemite Div., 398 Broadway, New York 13, N. Y. (ELECTRONIC TECHNICIAN B5-2)

(Continued on page 89)



WHICH WOULD YOU CHOOSE?

DUOTONE GUARANTEES THE WHOLE DIAMOND NEEDLE FOR EITHER MONOPHONIC OR STEREOPHONIC REPRODUCTION, AT NO EXTRA COST

What do we mean by the *whole* diamond needle?

There are two kinds of diamond needles now on the market. One is the *whole* diamond; the other is a diamond chip welded on a steel shaft. The overall length of both is the same. With the welded chip diamond the entire amount of diamond is visible on top of the steel shaft, and should there be a bubble resulting from heat or gas during the welding, the slightest jar can result in instant loss of the diamond. With the *whole* diamond needle, only ⅓ of the total diamond is visible and the remaining ⅔ is deeply embedded, crimped and cemented into the metal holder — thus making it impossible to shear off the point by any jarring or dropping of the tone arm.

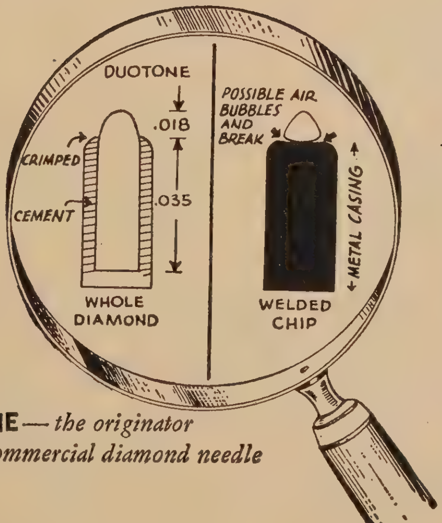
What are the additional advantages of a Duotone Diamond Needle?

All Duotone diamond tips are hand ground and polished to a mirror finish, hand radiused to the exact required specifications, and hand set in perfect alignment to the record grooves. None of these delicate hand operations can weaken a weld that does not exist in a *whole* diamond. The constant observance under microscopic inspection plus Duotone's exacting quality standards eliminate every possibility of imperfection — permitting Duotone's 100% guarantee of the diamond needle itself, better reproduction and longest life possible for the needle.

One more important feature of your Duotone Diamond Needle.

No diamond needle will last forever. Only Duotone Diamond Needles give you the "needle that remembers" service and warns you when the Company Technicians know that needle wear is getting dangerous for your record collection.

All this at no extra cost over ordinary diamond needles.



DUOTONE — *the originator of the commercial diamond needle*

DUOTONE

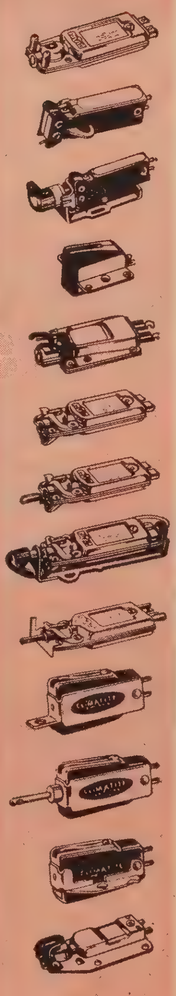
KEYPORT, NEW JERSEY

In Canada: Charles W. Pointon, Ltd., *Toronto*

BY SIMPLE DEFINITION...

Whale (hwāl),n. World's greatest mammal.

Astatic (ăstăt'ĭk),n. World's greatest phono cartridge name.



...ASTATIC IS A WHALE OF A PHONO CARTRIDGE LINE

Yes, there is ONE NAME that means more — far more — than any other in Phono Cartridges. Whether you are speaking of SIZE of the line, SIZE of original equipment sales or replacement sales made by distributors and dealers . . . whether you are speaking of COMPLETENESS of the line or the number of engineering FIRSTS which the line represents . . . the GREATER consumer preference, or the GREATER profits for distributors and dealers — NO MATTER HOW you look at it, there is ONE line that TOPS THEM ALL. That's Astatic. Over 100-million have been sold. Seldom in any industry does one line so greatly dominate and outsell all others. Whether YOU sell, install or use phono cartridges, Astatic has the best answer. IT'S A WHALE OF A LINE!

LOOK AT THESE RECENT ASTATIC CARTRIDGE FIRSTS

FIRST to bring to the public an efficient, mass-produced Stereo Cartridge.

FIRST with a COMPLETE Plug-in Phono Cartridge line, with diamond or sapphire tips.

FIRST to deal a direct knockout to cheap, inferior foreign cartridges, eliminating their one advantage — low cost — with an across-the-board Astatic price slash.

ASTATIC PHONO CARTRIDGES

CERAMIC CRYSTAL STEREO
MONAURAL PLUG-IN CONVENTIONAL
DIAMOND OR SAPPHIRE STYLI

Leader with originals — first with replacements

GO BY BRAND . . . GO BUY ASTATIC

THE Astatic CORPORATION, CONNEAUT, OHIO — KNOWN THE WORLD OVER —
IN CANADA: CANADIAN ASTATIC LIMITED, TORONTO, ONTARIO
EXPORT SALES: ROBURN AGENCIES INC., 431 GREENWICH ST., N.Y. 13, N.Y., U.S.A.

Audio NEWS LETTER

TURNER issues 8-page microphone and accessory catalog.

AMPEX adds stereo mike kit #880 @ $69.95, and headset kit #881 @ $55.95.

PILOT RADIO names Nickerson-Gray, Palo Alto, as N. Calif. rep.

DYNACO introduces panel mounting kit PM-2S for preamp and control kits.

M. A. MILLER MFG. releases 7-page replacement needle cross-reference guide.

BELL SOUND appoints Robert McCarthy to new Product Manager post.

THOMAS ORGAN announces Model 610 stereo phono/-radio combo in one cabinet. It uses Garrard changer. Price is $595.

FANON names Richard Moses as N.Y. direct factory rep, and reps Jack Zimmer, Merriam, Kansas; R. L. Linsley, Phoenix; and Levin-Sacks, Chicago.

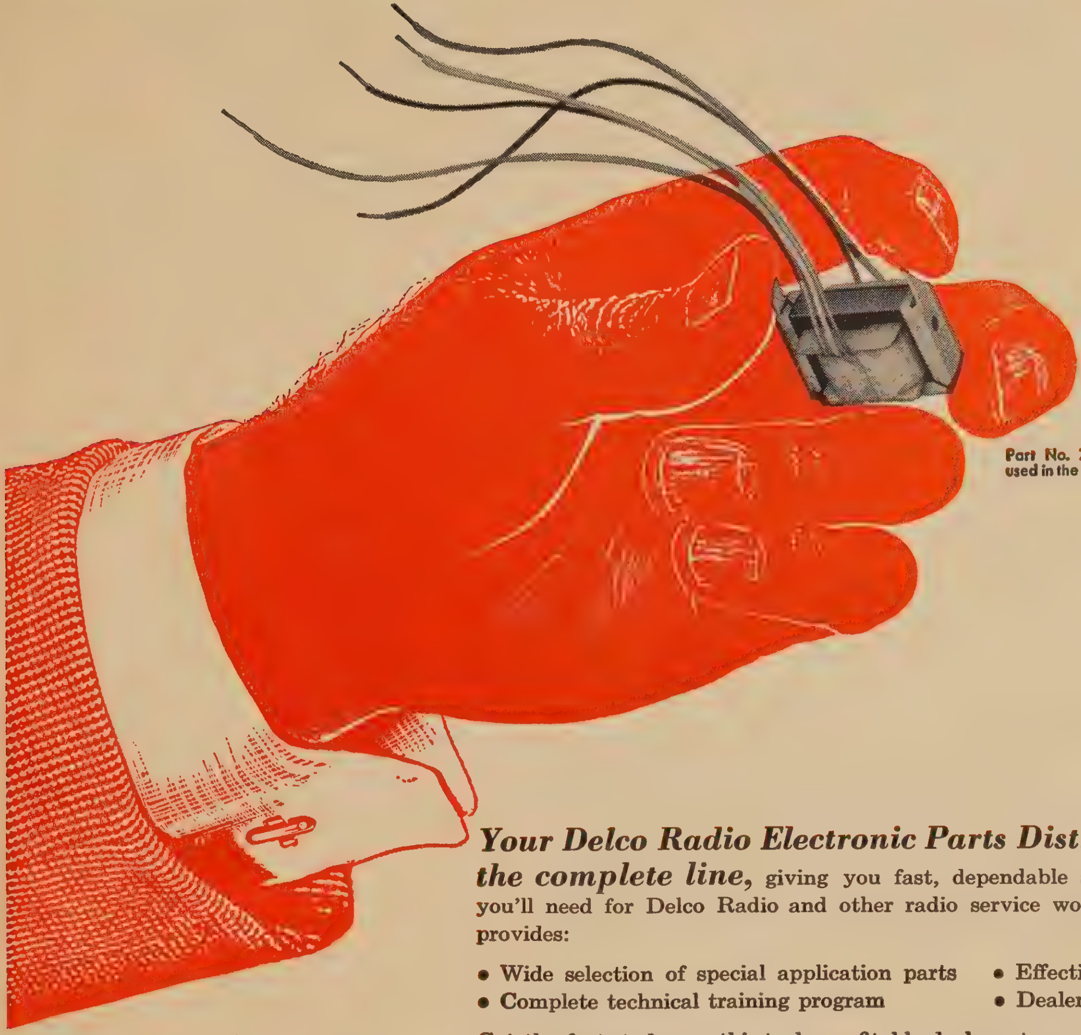
CLETRON offers a matched stereo speaker set for $98. It includes 12" woofer, 8" midrange, dual 3" tweeters and LC network in one carton.

CONTINENTAL MFG. announces the SA-20 stereo amplifier @ $59.95. Ratings are 10 watts/channel, 20 to 20,000 cps, dc on preamp filaments.

JUKE BOX STEREO averages 25% more plays than mono installations, reports IHFM Exec. Secy. Abraham Schwartzman. He told the annual convention of Music Operators of America that 90% of 1959's $300,000,000 retail hi-fi sales will be stereo, that 500 45-rpm stereo records will be available at the end of the year, and stereo will account for 40% of LP dollar volume this year.

(Continued on page 24)

Use Delco Radio Service Parts!



Part No. 7270804—output transformer used in the new Delco Portable Car Radio.

Your Delco Radio Electronic Parts Distributor carries the complete line, giving you fast, dependable service on the items you'll need for Delco Radio and other radio service work. Delco Radio also provides:

- Wide selection of special application parts
- Complete technical training program
- Effective warranty program
- Dealer identification signs

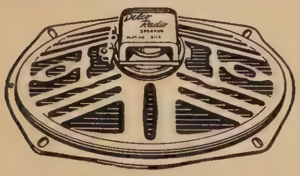
Get the facts today on this truly profitable dealer setup, and grow with General Motors!

Available everywhere through Electronic Distributors associated with . . .

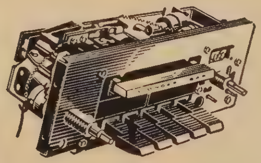
GM U·M·S PARTS SALES
UNITED MOTORS SYSTEM

DELCO RADIO

DIVISION OF GENERAL MOTORS, KOKOMO, INDIANA



SPEAKERS

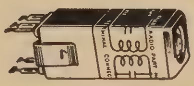


TUNER PARTS

DELCO
DS501
GM

TRANSISTORS

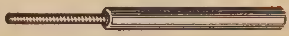
TUBES



COILS

6 VOLT
55A
Radio

VIBRATORS



IRON CORES

RESISTORS

Delco
Radio

CAPACITORS

CONTROLS

COME IN AND SEE US—
BOOTH 783

Convert **ANY** Phonograph to

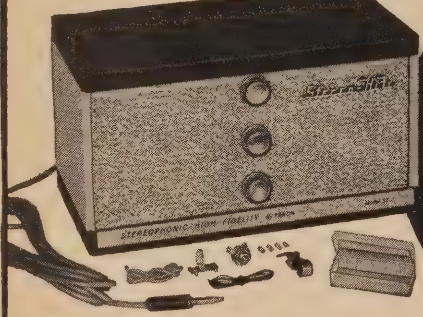
STEREO

with FANON

LOW-COST Conversion Kits

- Adapts Phono for both Stereo or Monaural.
- Improves Sound Quality of Monaural Records.
- Second amplifier-speaker system adds depth.

With the big boom in stereo records and stereo phonographs, you can bring any hi-fi record player up to date to play both monaural and the new stereo records. Simple to install, the new Fanon Kits offer you top fidelity for the most economical changeover today. Speaker-amplifier unit alone can be used with tape recorders, tuners, etc. Your customers get more for their dollars with Fanon.



FANON STK-4

Complete high fidelity three tube amplifier system with two 4" phased speakers in handsome two-tone fashion-fabric cabinet. Separate bass, treble and volume controls for second channel. Kit includes hi-fi ceramic turnover stereo cartridge, mounting accessories, phono jack and 15 feet of extension cable to unit.

ONLY $\$39^{95}$ List

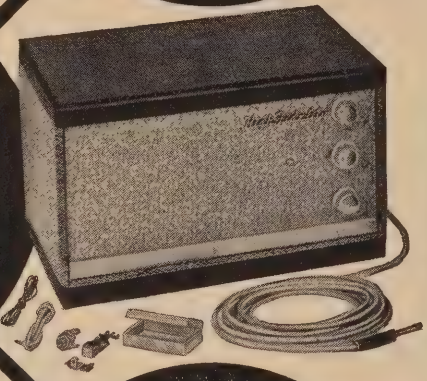
Speaker-amplifier-cable unit (Model ST-4) $31.95 List

FANON STK-5

High fidelity 5-tube push-pull amplifier with one 8" woofer and one 3" tweeter in smartly designed two-tone cabinet. Separate bass, treble and volume control for second channel. High fidelity ceramic turnover Stereo cartridge, mounting accessories, phono jack and 15 feet of extension cable included in kit.

ONLY $\$49^{95}$ List

Speaker-amplifier-cable unit (Model ST-5) $41.95 List



FANON STK-10

Beautifully finished, hand-rubbed mahogany, walnut or blonde cabinet complete with same quality components as in STK-5 above. Kit includes high fidelity ceramic turnover stereo cartridge, accessories, phono jack and 15 ft. extension cable. Ideal for converting consoles.

ONLY $\$59^{95}$ List

Speaker-amplifier-cable unit (Model ST-10) $51.95 List

Ask your Fanon representative for complete information and installation instructions on Fanon kits and about the complete line of Fanon Hi-Fi Stereo Phonos.

FANON ELECTRIC CO., INC.
Dept. ET-5, 98 Berriman St., Brooklyn 8, N. Y.
In Canada: Active Radio & TV Dist., 58 Spadina Ave., Toronto

(Continued from page 22)

GENERAL ELECTRIC publishes 26-page booket, "Fifteen Minutes to Stereo," @ 25¢.

JENSEN INDUSTRIES introduces Sil-Spray, a silicone spray mist in an aerosol can. It cuts record static. Price is $1.25.

PICKERING announces a lifetime warranty for its Stanton 371-.7D stereo Fluxvalve cartridge and Model 196 arm.

AMPLIFIER CORP. of America introduces the transistorized TransMagnemite tape recorder. Dry rechargeable batteries are used.

DUOTONE will promote fact that it uses whole diamond needles, 2/3 cemented and crimped into holder, instead welding a chip on a shaft.

UNIVERSITY releases a new 8-page speaker catalog, including 2 pages on hi-fi speakers and enclosures suitable for commercial installations.

ROBINS INDUSTRIES appoints reps: Carmine Vignola, Jefferson City, Mo.; Koether-Cox, Denver; James Podolny, Pittsburgh; Paul Hayden, East Point, Ga.

STROMBERG-CARLSON introduces a line of stereo component ensembles in the $350-$3000 range. Major feature is variety of cabinets into which components are inserted. Two "Labyrinth" speaker systems in cabinet are isolated on rubber pads to cut feedback.

AUDAX High Fidelity Speaker Div. of REK-O-KUT appoints reps: Belchamber & French, San Francisco; Edwards-Lohse, Cleveland; Charles Hansen, Los Angeles; Heiman Co., Minneapolis; Karet-Margolin, Chicago; Norman Kathrinus, St. Louis; Land-C-Air, Tuckahoe, N.Y.; V. Avis McCorvey, Decatur, Ga.; Moss Sales, Greeley, Colo.; Burt Porter, Seattle; Robert Reiss, W. Haven, Conn.; J. Y. Schoonmaker, Dallas; Atlas Radio Toronto; Morhan Export, N.Y.C.

New G-E 6L6-GC makes audio "come alive"!

All-new high-power, low-distortion Service-Designed beam pentode is your key to hi-fi service volume and profit!

General Electric's new 6L6-GC can replace these four tubes in existing sockets—6L6-GB, KT66, 5881, 7027. Economical, the 6L6-GC has higher plate and screen dissipation ratings than any of the others, to handle peak power demands with low distortion. Music with full concert-hall brilliance and beauty is the result. Customers *hear* the improvement!

Most installations involve two 6L6-GC's. That gives you double profit! G.E.'s Service-Designed winner has new 5-layer plate; new bulb for better heat radiation; many other features that spell top performance. See your friendly G-E tube distributor! *Distributor Sales, Electronic Components Division, General Electric Company, Owensboro, Kentucky.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

2-111-204

more test equipment per dollar!

RCA WT-110A AUTOMATIC ELECTRON TUBE TESTER

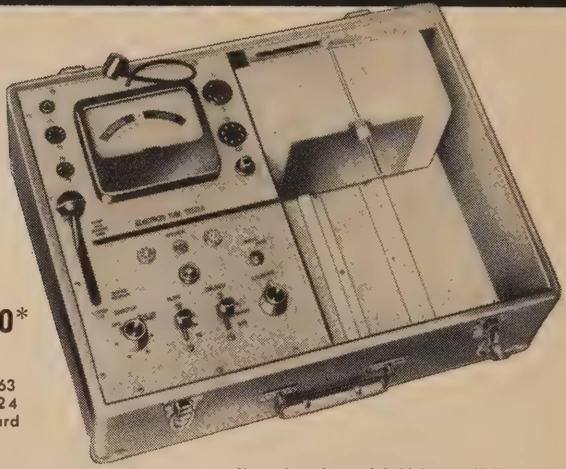
Speed...Accuracy...Dependability

The WT-110A automatic punched-card tester is virtually obsolescence-proof! Designed especially for use in TV and general electron tube service testing, the RCA WT-110A provides *expandability* to cover new tube types as they are released, *versatility* to speed-test diodes, triodes and other multi-electrode tubes as well as double- and triple-unit tubes having dissimilar units, and *economy* that will pay for itself in time saved, new business and prestige! Try it yourself at your local RCA Test Equipment Distributor!

ONLY

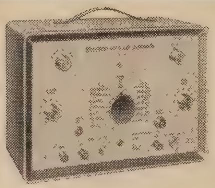
$199.50*

(Complete with 263 punch cards, 24 blank cards, and card punch.)



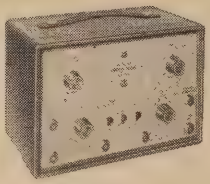
- Fully automatic! Sets up all socket connections and all operating voltages for heater, control grid, plate, screen grid, and bias.
- Checks for shorts and leakage between each element and all others consecutively—plate, screen, control grid, cathode. Multiunit tube sections checked individually.
- Checks amplifier tubes for transconductance—green scale indicates normal range of tube's transconductance.
- Normal and special high-sensitivity tests for gas and leakage.
- Automatically selects correct test conditions from 220 different heater voltages (from 0.1 volt to 120 volts) at currents up to 4 amps., 10 bias voltages, and 11 values of cathode resistance.
- Rectifier-type tubes tested for emission under heavy load currents (up to 140 ma per plate).
- 12-volt plate-and-screen supply for testing new auto-radio tubes.

more dollars per service call!

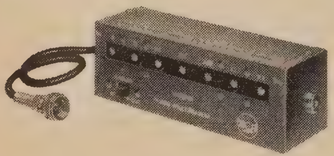


WR-69A TV/FM SWEEP GENERATOR – top visual aligning and trouble-shooting equipment for color-TV and FM! Especially suited for aligning color-TV (if/video output frequency has continuous tuning from 50 Kc to 5 Mc) – essential for aligning color-TV video and chrominance stages. **$295.00***

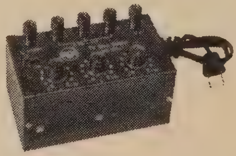
WR-99A CRYSTAL CALIBRATED MARKER GENERATOR – supplies fundamental-frequency rf carriers of crystal accuracy for use in aligning and trouble-shooting color and monochrome TV, FM, and other electronic equipment operating in the 19 to 260 Mc range. **$242.50***



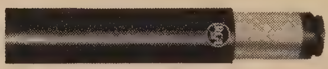
WR-70A RF/IF/VF MARKER ADDER – provides a choice of four markers for rf, if, and video sweep alignment of color and black-and-white TV receivers. Designed for use with a variety of conventional marker and sweep generators. **$74.50**



WG-295B VIDEO MULTIMARKER – provides seven simultaneous absorption-type markers at accurately preset frequencies for marking video response curves in color receivers. **$32.50***



WG-307A TV BIAS SUPPLY – for use in aligning black-and-white and color-TV – has three fully adjustable 0 to 15-volt outputs, plus a negative 100 volts output for biasing the burst keyer. **$22.50**



WG-309A-TV MICROSCOPE–especially designed for the direct observation of the phosphor dot pattern, the WG-309A is a valuable service aid for convergence and purity adjustments in color-TV receivers. **$24.95***

Individual technical bulletins covering features and specifications of each of the above instruments are available from your nearest RCA Test Equipment Distributor, or write RCA Commercial Engineering, Section E-46-W, Harrison, N. J.

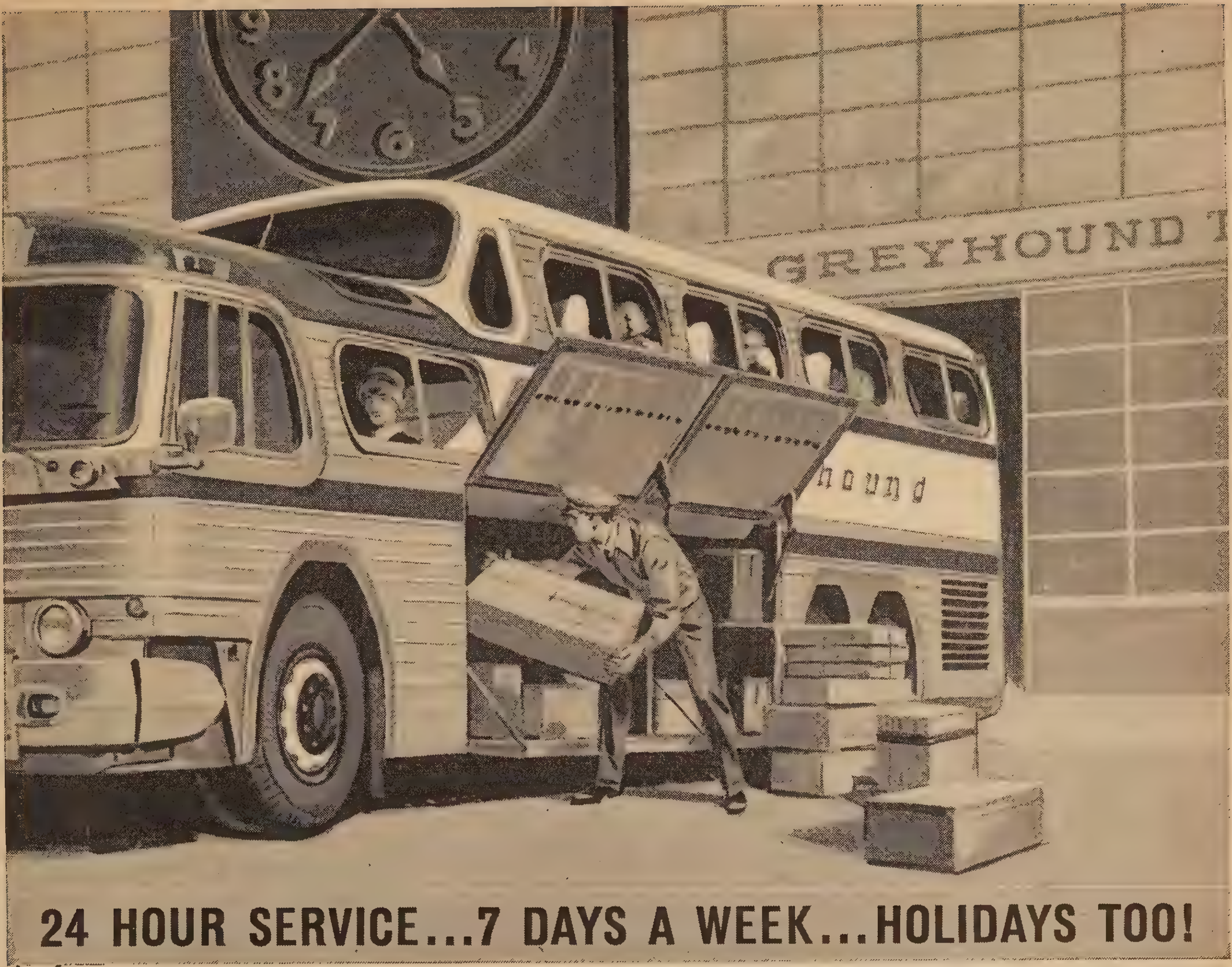
ALL—at your local RCA TEST EQUIPMENT DISTRIBUTOR!

RCA®

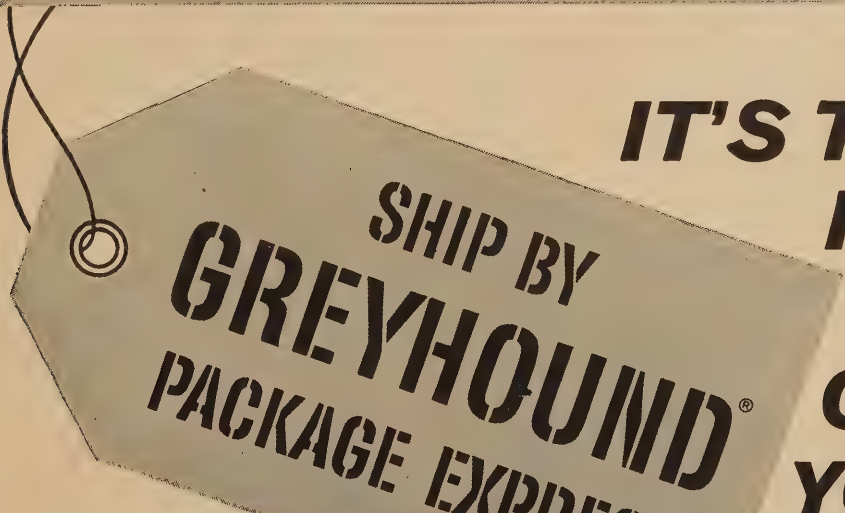
RADIO CORPORATION OF AMERICA

Electron Tube Division ***Harrison, N. J.***

*User Price (Optional)



24 HOUR SERVICE...7 DAYS A WEEK...HOLIDAYS TOO!



IT'S THERE IN HOURS ...AND COSTS YOU LESS!

Your packages go anywhere Greyhound goes . . . and Greyhound goes over a million miles a day! That means faster, more direct service to more areas, including many, many places not reached by other public transportation.

What's more, Greyhound Package Express offers this service seven days a week . . . twenty-four hours a day . . . even on weekends and holidays! On Greyhound Package Express packages get the same care and consideration as Greyhound passengers . . . riding on dependable Greyhound buses on their regular runs. You can send C.O.D., Collect, Prepaid—or open a Charge Account.

Call your nearest Greyhound bus station or write to Greyhound, Dept. H-5, Jarvis Ave., Chicago, Ill.

XCELITE® *Quality* HAND TOOLS !

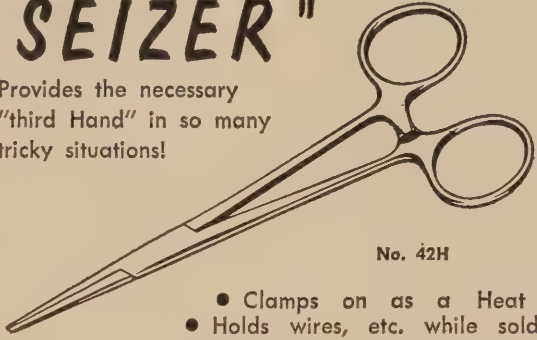
Preferred by the EXPERTS . . .

they do the job better, faster, retain their efficiency longer . . . and cost less in the long run.

Parts Show Booth 225!

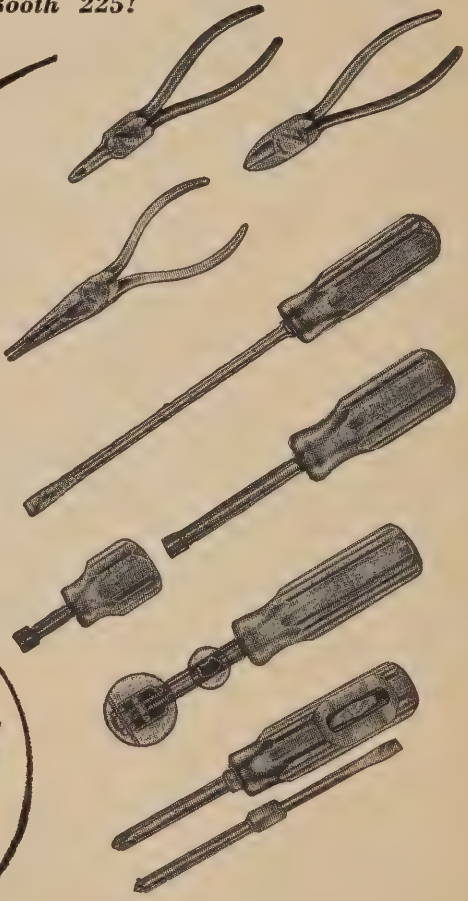
Check the New "SEIZER"

Provides the necessary "third Hand" in so many tricky situations!

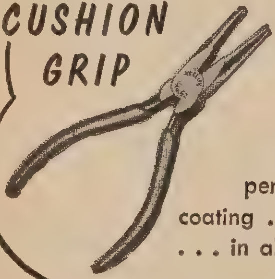


No. 42H

- Clamps on as a Heat Sink.
- Holds wires, etc. while soldering.
- Holds dial cords when stringing them.
- Retrieves small items from awkward places.
- Out-reaches and out-holds needle nose pliers.



. . . and New CUSHION GRIP PLIERS

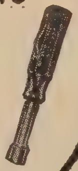


Handles have permanent plastic coating . . comfortable, . . . in all styles

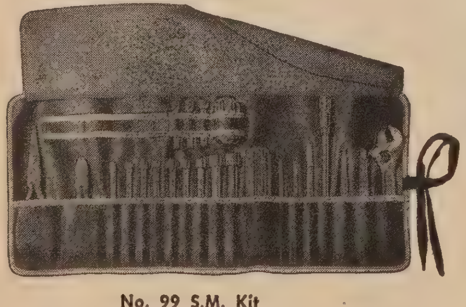
. . . also New MIDGET NUTDRIVERS

Color Coded

HEX SIZES:
3/32", 1/8",
5/32", 1/4",
5/16", 3/8"

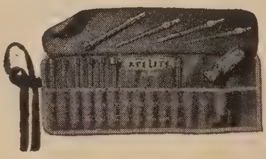


SPECIAL-PURPOSE PLIERS
QUALITY SCREWDRIVERS
COLOR-CODED NUT DRIVERS



No. 99 S.M. Kit

No. 99PR Roll Kit



No. 99-JR Roll Kit

Sell Xcelite Tools . . . more Sales and Profits !

XCELITE, INCORPORATED
ORCHARD PARK, NEW YORK
In Canada – Charles W. Pointon Ltd., 6 Alcina Avenue, Toronto, Ontario

XCELITE
Quality Hand Tools
PREFERRED BY THE EXPERTS

ELECTRONIC TECHNICIAN

SERVICE

A Balanced Approach to TV Sales & Service

Here's how many astute service dealers are building profits from TV, and cementing customer relations in the process. Depending on *technical* considerations, the set owner is given the choice of having his TV repaired or replaced by a single source.

Repair calls generally fall into three categories:

1. *Moderate service required.* Typically, a two year old set that cost $250 needs $20 of maintenance to put it in working order. Obviously the receiver should be repaired.

2. *Costly service required.* A set owner frequently finds himself in the dilemma of having to decide whether his somewhat aging set should be repaired at substantial cost, say $50 to $75, or replaced with a new set. His decision will have to be based in great measure on the technician's advice. The consumer is torn between two desires: He hates to spend a great deal on a new set, and he is reluctant to sink more money into repairing a set that is in its declining years. More on this later.

3. *Very expensive service required on an old set.* Here we have a TV receiver that has seen its day. Many parts are worn, top performance can not be brought back, and it could cost $70 or $80 just to get a half-decent picture. The customer is better off, and the technician will eliminate a callback headache, if the old dog is junked in favor of a new set.

Selling Sets

There is no reason for service dealers to lose their profit just because, in the customer's interest, they have honestly advised that it doesn't pay to fix a particular set. These dealers can sell sets too, keeping a minimum inventory of one or two brands. In other words, give the customer sincere advice on whether to repair or junk a set . . . and stand ready to serve him regardless of which choice he makes.

In those situations where it is a toss-up whether or not to repair, as in Case 2 above, some service dealers have developed effective variations of the following guarantee plan. If the customer wants a new set immediately, the dealer allows him to trade in the old inoperative set at the salvage value, say $30. If the customer wants to repair the old set, he is given a guarantee such as this to protect his investment: If the set should break down in the six months following repair, a pro-rata trade-in allowance will be made toward the purchase of a new set.

Suppose the repair bill was $60. If the set breaks down again after four months, and the customer wishes to buy a new set from the same service dealer, the total trade-in is $\frac{2}{6}$ of $60 (for the unused part of the six month guarantee) plus $30 (scrap value), or $50 total.

The technician can put the trade-in set back in working order during slack periods if he wishes, selling it for a price sufficient to cover most or all of his time and trade-in costs.

The brands you select to sell should be chosen on the basis of your experience and design considerations. And the customer should be told this, with the explanation that you stand behind any set you sell. When a particular set maker has a technical message for you, read it carefully to help you decide on your preferred brands.

The first step, if you are not already selling sets—and this applies to radio and hi-fi, as well as TV—is to contact the distributor in your area. His name can be obtained in the yellow pages of the phone book or from the manufacturer. He can also be approached most effectively by a group of dealers, such as a service association.

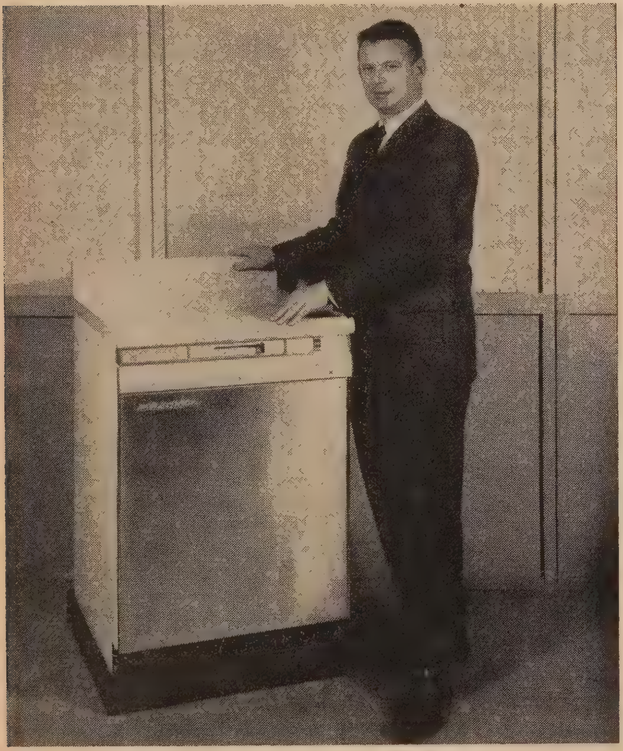
Sale or service—give your customer his choice, so you can get both halves of the TV business.

Tuning In the

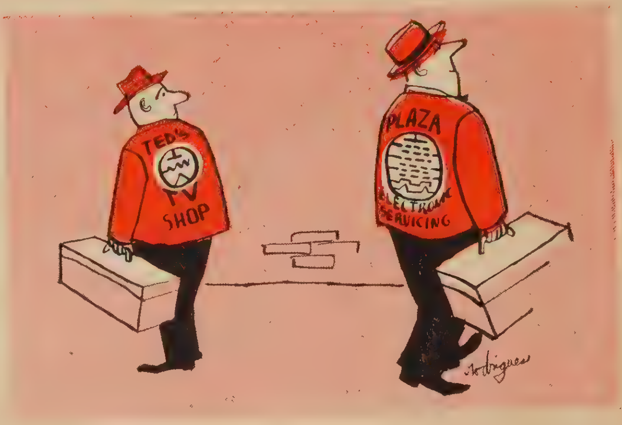
PAY-TV tests under stringent limitations have been authorized by FCC. Each pay system is limited to a single market where at least four TV broadcast services are available. There can not be any charge to consumers for equipment or its installation. The next step is for a TV station licensee to apply to the FCC for test authorization.

CONGRESS has been asked by the FCC to amend the Communications Act to permit VHF booster stations on all channels except 4 and 5. Boosters on the air prior to Jan. 1, 1959 could thus be legalized by licensing. In addition to the periodic checks, these boosters would be required to transmit on a channel other than the one used by the broadcast station's consent to rebroadcast. In another action, FCC told Congress that it had no present jurisdiction over community antenna systems.

ULTRASONIC DISHWASHER



Ultrasonics, which has served science and industry so well, will now serve consumers directly in the form of this dishwasher made by Narda Ultrasonics Corp. Water is compressed and decompressed by 40 kc sound waves to cut the wash-dry cycle in half to 25 min. Initial price will exceed $800, but should drop with volume production.

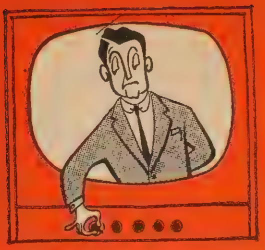


MAINTENANCE CLUBS are springing up across the country, and we expect an increasing number of service dealers to be approached by the promotors of these plans. There are several plan variations, but a typical arrangement works as follows. The consumer joins the plan paying a $5 or $10 annual fee. Whenever a household item requires maintenance, be it plumbing, carpentry, electrical, masonry, roofing or TV, the plan office is called. In turn, the plan notifies the appropriate specialist it works with, and the house call is made. The service specialist then invoices the plan, which pays the bill, less a small percentage deduction. The customer pays the plan the full amount. Purpose of these plans is to provide the consumer with a centralized source of reliable maintenance for a wide variety of products.

EIA SERVICE COMMITTEE has spelled out a plan to increase the stature of the TV service industry. It includes the dissemination of information on merchandising, customer relations and management techniques.

NEW SEMICONDUCTORS with interesting designs are being developed thick and fast. Bell Labs has come up with a 4-terminal field-effect tetrode which can function as a transformer, isolator, modulator or negative resistance. It consists of a diffused junction semiconductor disc with a trench etched into both sides. RCA has introduced a multi-unit diode-triode transistor for battery radios. Thus this single germanium pellet can function as a detector and audio amplifier. Texas Instruments has come up with a gallium arsenide diode with stable high temperature properties. It is combined with other semiconductors to provide a complete solid circuit, such as a multivibrator, the size of a match head.

Picture ....



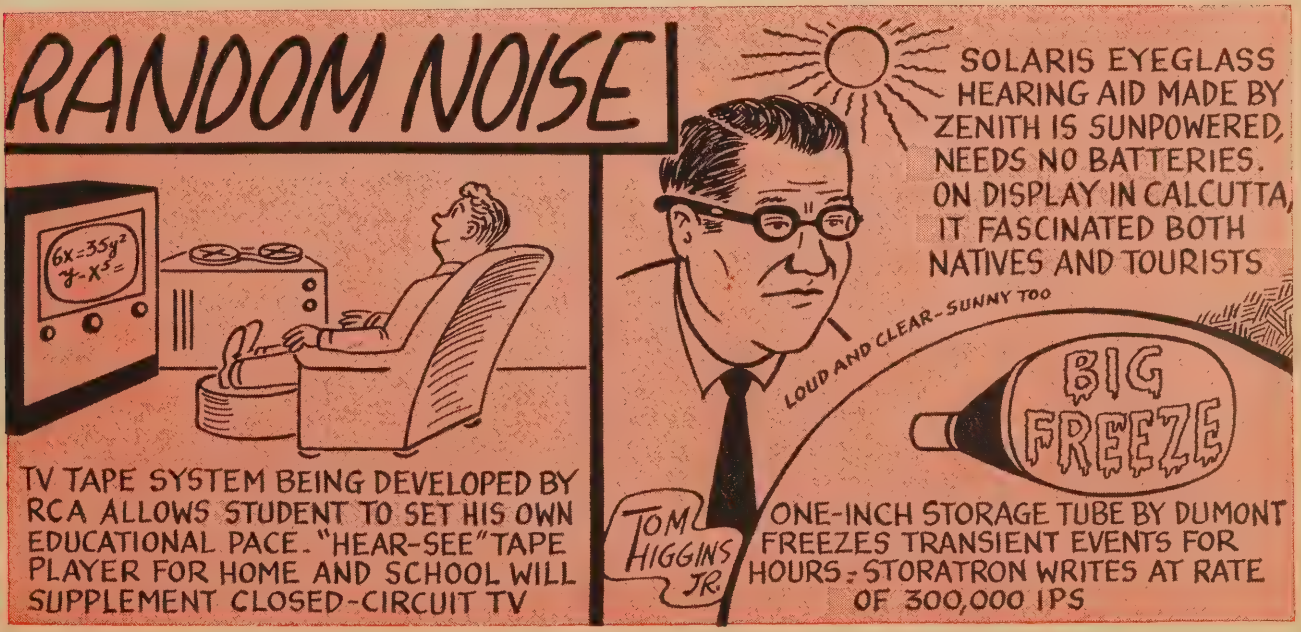
WHAT A SHOW! The 1959 IRE Show, held in New York City some weeks ago, drew some 60,000 technical people to its 950 exhibits. The symbolic opening was marked by the cutting of a video tape ribbon, actuated by a signal from the solar-powered satellite launched a year ago. Among the more than $15 million worth of products displayed were some fascinating developments. There were micro-miniature components so small that 1,000,000 could be crammed into 1 cu. ft. There were rolled metals, so small that 75 laid side-by-side could hide behind a human hair. There was an 18 ft. shaker capable of crumbling the Coliseum's walls. There was a design presentation for automatic control devices that learn to improve their performance based on experience. And plenty more.

ANTENNA LOVE. The *New York Times* reports that a Rye, N.Y., family was awakened at 5 AM every morning for ten days by a strange metallic knocking and banging lasting an hour. First a plumber was called; no trouble with the pipes. Then a heating engineer; the heating system was fine. Then the gas repair man came to check; no culprit here. On an inspiration, the bleary-eyed resident ran outdoors one morning when the noise started. There, lo and behold, was a woodpecker on the TV antenna atop the roof, hammering it like a blacksmith. Chances are the little feathered friend was not trying to chop down the skyhook. All he wanted was a mate—and the antenna made a fine sounding board for his love call.

CALENDAR OF COMING EVENTS

May 8-10:	Council of Radio & TV Service Associations, Annual Tele-Rama, Sheraton Ritz-Carlton Hotel, Atlantic City, N. J.
May 11-13:	Joint Conference on Automatic Techniques, Pick-Congress Hotel, Chicago, Ill.
May 11-13:	Radio Technical Commission for Marine Services, Assembly Meeting, Mount Royal Hotel, Montreal, Canada
May 18-20:	1959 Electronic Parts Distributors Show, Conrad Hilton Hotel, Chicago, Ill.
May 25-27:	American Society for Quality Control, Annual Convention, Public Hall, Cleveland, Ohio
July 3-18:	The Associated Radio & TV Servicemen, Illinois, Navy Pier, Chicago, Ill.
Aug. 18-21:	Western Electronic Show & Convention (WESCON), Cow Palace, San Francisco, Calif.
Aug. 21-24:	NATESA Convention, Congress Hotel, Chicago, Ill.
Sept. 30-Oct. 1:	Industrial Electronics Symposium, Mellon Institute, Pittsburgh, Pa.
Oct. 5-7:	Fifth National Communications Symposium, Hotel Utica, Utica, N. Y.
Oct. 5-10:	1959 New York High Fidelity Music Show, New York Trade Show Bldg., New York, N. Y.
Oct. 7-9:	IRE Canadian Convention, Toronto, Ontario
Oct. 12-14:	National Electronics Conference, Hotel Sherman, Chicago, Ill.

THE RUSSIANS are in for a bit of electronic entertainment this summer—American style. At the American National Exhibition in Moscow, RCA will show a color TV system, and the Institute of High Fidelity Manufacturers will demonstrate the latest in hi-fi stereo.


RANDOM NOISE
6x=35y²
y-x⁵=
TV TAPE SYSTEM BEING DEVELOPED BY RCA ALLOWS STUDENT TO SET HIS OWN EDUCATIONAL PACE. "HEAR-SEE" TAPE PLAYER FOR HOME AND SCHOOL WILL SUPPLEMENT CLOSED-CIRCUIT TV
SOLARIS EYEGLASS HEARING AID MADE BY ZENITH IS SUNPOWERED, NEEDS NO BATTERIES. ON DISPLAY IN CALCUTTA, IT FASCINATED BOTH NATIVES AND TOURISTS
LOUD AND CLEAR-SUNNY TOO
BIG FREEZE
ONE-INCH STORAGE TUBE BY DUMONT FREEZES TRANSIENT EVENTS FOR HOURS - STORATRON WRITES AT RATE OF 300,000 IPS
TOM HIGGINS JR.

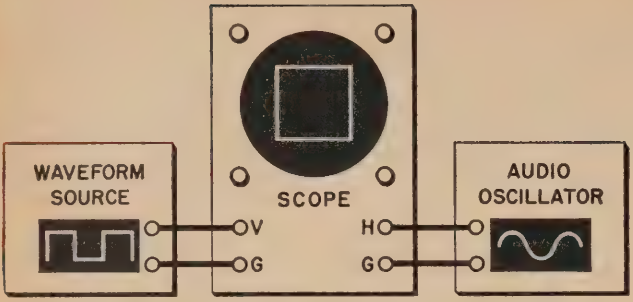

WAVEFORM SOURCE
SCOPE
AUDIO OSCILLATOR
V
G
H
G

Fig. 1—Scope and sine wave generator are connected in this manner to find fundamental and harmonic content of square waves.

Scope And Signal Generator Reveal Harmonic Content Of Square Waves, And Provide An Interesting Study Of Waveform Formations

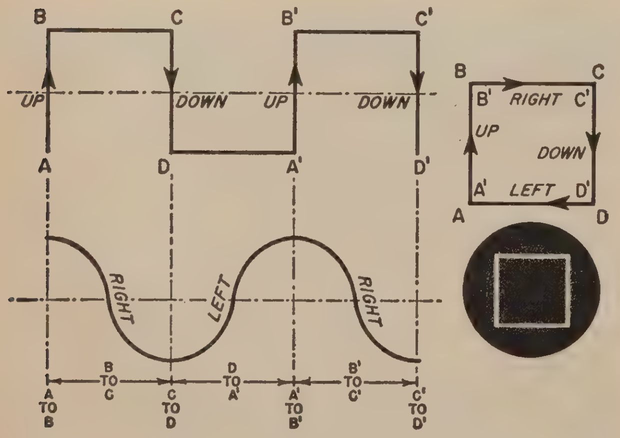
Lissajous Patterns Aid Waveform Analysis

ROBERT G. MIDDLETON

• An interesting and convenient method to reveal harmonic content of square waves, and other complex waveforms, with just a scope and audio oscillator, is presented. This technique is all the more attractive, because no elaborate equipment or circuitry is required. To perform this procedure, the test set-up shown in Fig. 1 is used. The square-wave voltage which is to be scrutinized, is applied to the scope's vertical-input terminals. The sine-wave voltage from the audio oscillator is applied to the scope's horizontal-input terminals. Vertical and horizontal gain controls are adjusted as for conventional Lissajous patterns (symmetrical shapes) on the scope screen. The frequency of the waveforms may have any value within the range capabilities of the test instruments, such as 60 cycles, 15,750 cycles, etc. The audio oscillator is first tuned through the fundamental frequency of the square wave. When the sine-wave frequency passes through the fundamental frequency of the square wave, a square is displayed on the scope's CRT. Just how the tracing of the square is accomplished is shown in Fig. 2.

When the sine-wave frequency is increased to 3 times the fundamental frequency of the square wave, a square Lissajous pattern is again displayed on the scope screen. This indicates that the square wave con-

Fig. 2—How the square pattern is obtained. Square wave moves CRT beam up and down, while the sine wave moves it from side-to-side.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A TO B
C TO D
A' TO B'
C' TO D'
B
C
B'
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C'
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LEFT
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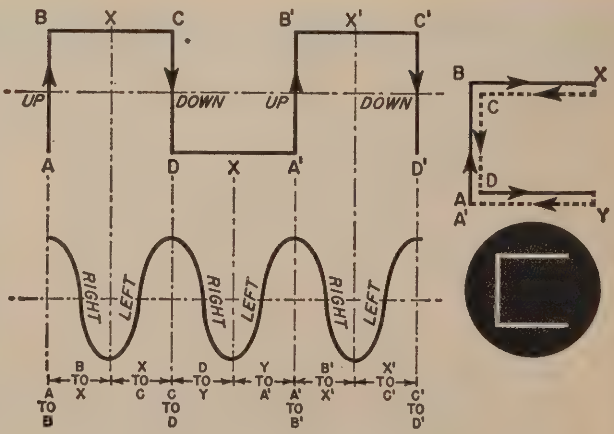
D

Fig. 3—An open pattern is seen when the sine wave is an even harmonic. A closed pattern indicates a fundamental, or odd harmonic.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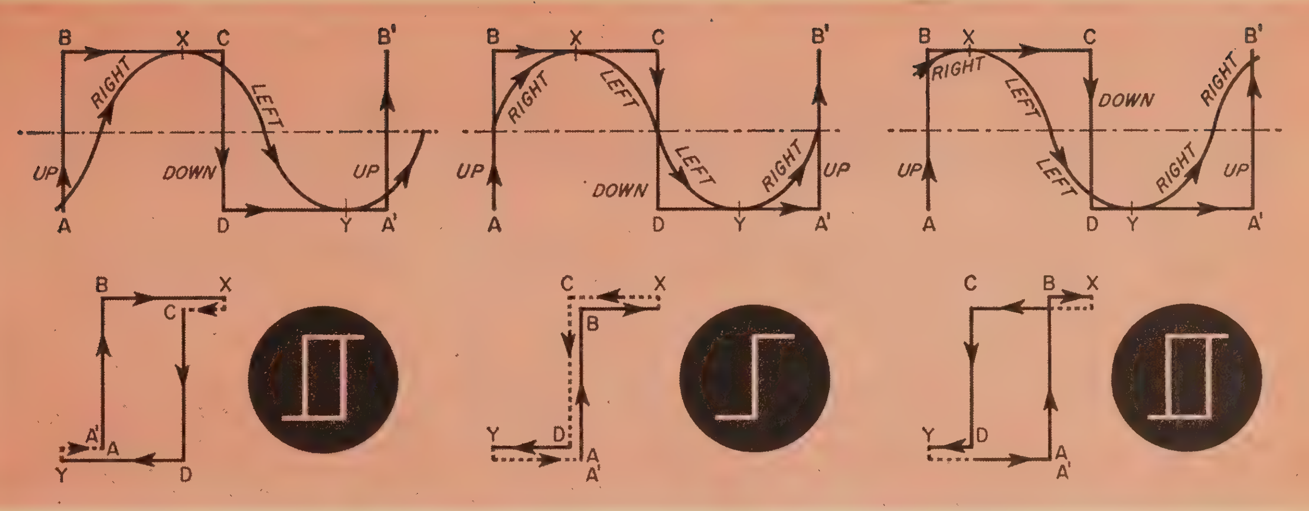
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Fig. 4—A square is obtained only when the phase and frequency are exactly right. Phase variations cause the pattern to cange. Vertical lines AB and CD, move back and forth. At either extreme they form the sides of a square. In the center they become superimposed.

tains a third harmonic. The same thing would happen on other odd harmonics, since square waves contain odd harmonics.

What happens when the audio oscillator is tuned to the second harmonic frequency? The Lissajous pattern then appears to be open as shown in Fig. 3. The open pattern leads to the interpretation that the square wave does not contain a second harmonic. An open pattern again appears when the audio oscillator is tuned to the fourth and higher even harmonic frequencies of the square wave. A square wave does not contain even harmonics.

No mathematics are needed to visualize this action. The square wave at the scope's vertical input terminals, causes the beam to go up and down, while the sine wave at the horizontal terminals causes the beam to go from side-to-side. Notice that the horizontal trace to the right in Fig. 2 occurs while the square wave goes from points A to D, and that the trace to the left coincides with points D to A′. Points A and A′, B and B′, C and C′ and D and D′ coincide. Therefore, only one square pattern will be observed. The same visualization process applies to Fig. 3. Notice that the horizontal trace reverses itself at points X and Y, and that the dotted line is actually superimposed on the solid line, and all that can be seen is an open pattern in the form of a square letter C. (Superimposed lines and points of reversal in the other diagrams found in this discussion are presented in the same manner.)

What has been shown here are actually two special cases wherein the fundamental and second harmonic phase is just right to illustrate the basic concept. It can be expected that the shapes, while essentially open or closed rectangles or squares, vary a great deal depending upon both phase and frequency differences. What happens at other times?

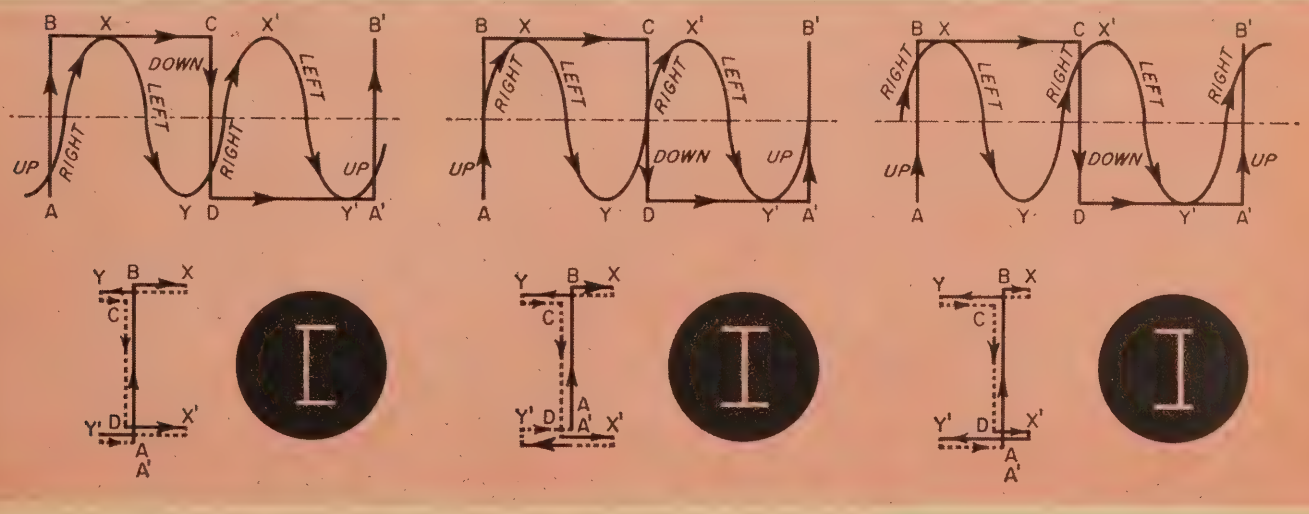
As the audio oscillator is grad-

(*Continued on page 62*)

LISSAJOUS PATTERNS

There is more in every waveform than meets the eye, and more, perhaps, than anyone shall ever see. Lissajous patterns are commonly used to compare frequencies and to calibrate audio oscillators. It is not generally recognized that Lissajous patterns can also be used to identify the harmonics in a complex waveform, such as a square wave.

Fig. 5—The open square presents itself under certain conditions of phase and frequency relationships. Phase may drift even without touching the generator's controls. Actually, only the vertical line moves back and forth. Because there is but a single vertical line present in the case of the second and even harmonics, the wave shape cannot appear as a closed form at any time.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Reactors & Magnetic Amplifiers

Present Widespread Use And Continued Expansion Of

Barron Kemp

- Like any tube or transistor amplifier, the magnetic amplifier reproduces at its output an enlarged version of a signal applied to its input. The output signal may manifest itself as an increased voltage, current, or power, and it can do this with minimum distortion. While tubes and transistors are generally thought of as voltage and current amplifiers respectively, magnetic amplifiers are generally considered to be power amplifying devices.

Amplifying elements of magnetic amplifiers are saturable reactors which look like transformers. They rely upon the magnetic properties of special core material for amplification. Principles of electromagnetism reveal: (1) that a current flowing through a coil causes a magnetic field to be established around the coil; (2) intensity (magnemotive force) of this magnetic field depends upon the amount of current flowing through the coil and the number of turns of wire in the coil (ampere-turns); (3) the magnemotive force thus established by the current-flow sets up a flux intensity around the coil which is dependent upon the reluctance (similar to resistance) of the coil; and (4) the reluctance of the coil depends upon the type of core material. Bosenquet's law, which is similar to Ohm's law, states that the flux (maxwells) is equal to the magnemotive force (ampere-turns) divided by the reluctance.

The reluctance of an air-core coil is constant, regardless of the amount of current. Therefore in an air-core coil the flux density is proportional only to ampere-turns. When the core of a coil is made of magnetic material, the reluctance is no longer independent of the current value. When the current through a magnetic-cored coil is low, the inductance is low, and the flux density is high, as compared to an air-core coil under similar conditions. Induction gradually increases as the current increases. Flux also increases, but the rate of increase declines. After the current reaches a certain value, depending upon the type of core material, the reluctance increases very rapidly until its value approaches that of air. In this region, point B in Fig. 1, any further increase in current produces no appreciable increase in flux. This is the point of saturation. A saturated core acts like an air core, offering minimum impedance to current flow.

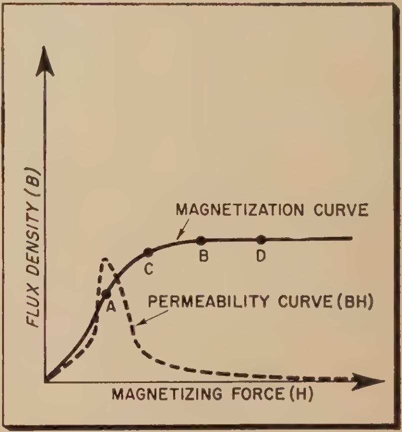


Fig.1—A saturated core, point B, acts like an air core and offers minimum impedance to current flow. The magnetic amplifier operates around point C, where a small change in ampere-turns causes a large change in inductance.

MAGNETIC AMPLIFIERS

The magnetic amplifier is not a new device. Principles of saturable-core control were used in electrical machinery as early as 1885, although the device was not identified as such at the time. In the United States, saturable-core devices have been used in electrical machinery since about 1900.

The general belief that the magnetic amplifier is a German invention is erroneous; actually, it is an American invention. Germany improved the efficiency and response-time, reduced weight and bulk, broadened the field of application and handed, or fired it back to us. It was primarily the improvements in processing magnetic materials and the introduction of selenium rectifiers that led to the wide use of magnetic amplifiers in Germany.

During World War II, the German Navy used magnetic amplifiers in master gun stabilizers and as cathode followers . . . replacing electron tubes in computer circuits. The Luftwaffe used magnetic amplifiers in automatic pilot and ground approach systems, servo and frequency-control systems for long-range rockets, blind-landing aids, and to regulate fuel flow in relation to atmospheric and ram pressure in some types of guided missiles. The German Army had started to apply magnetic amplifiers to the V-2 rocket stabilizer and steering system when the war ended.

German civil interests were quick to realize the advantage of magnetic amplifiers, applying the device to computing machines, electric brakes for trucks and locomotives, high-voltage (up to 50,000 kva) power lines, a-c streetcar controls, and many other uses. The fact that the Germans introduced the magnetic amplifier into fields previously dominated by electron tubes is considered to be just as important as the technical development of the magnetic amplifier itself.

In Industrial Electronics

Applications Call For Another Look At Magnetic Maneuverings

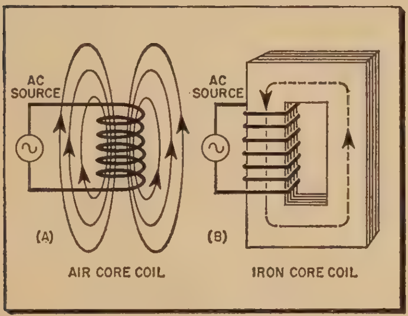


Fig. 2—Simple form of reactor. Lines of flux change direction each time the applied voltage changes polarity.

Inductance is proportional to the rate-of-change of flux density with respect to the intensity of the magnetic field. In a coil having the typical magnetization curve shown in Fig. 1, in the region around point A, a small change in current produces a large change in flux density, and the inductance is relatively very large. It should be noted that this vicinity is below the point of saturation. By the same token, inductance falls off as the saturation point is approached.

A familiar application of the saturable reactor is the swinging choke. The swinging choke operates on the portion of the characteristic curve between points A and B. For low values of current, the coil inductance is quite high, and for high values of current, the inductance drops as the core approaches saturation.

The air gap of a swinging choke is much smaller than in an ordinary choke, which permits the swinging choke to become more easily saturated. When the swinging choke is used as a voltage regulator, nearly constant voltage is obtained even with widely varying load current values.

Functioning of a magnetic amplifier depends upon a condition of variable inductance. The inductance may be changed by changing the intensity of the magnetic field. Examine once again the curve in Fig. 1, and note that it is approximately straight from its origin to the region below point C, and that it is quite steep. From this it can be deduced that the characteristics of this region are: (1) inductance is high and of constant value and; (2) changes in ampere-turns produce very high linear changes of flux density. Therefore, little or no change in inductance takes place with changes in ampere-turns. Since there is little change in inductance in this region, it is unsuitable as an area of operation for the magnetic amplifier.

In the curved or non-linear portion of the curve around point C, the inductance changes very rapidly with small changes of ampere-turns. The rate-of-change of flux density with respect to ampere-turns is still quite large. This then is the region which is suitable for magnetic amplification. A small change in ampere-turns will produce a large and significant change of inductance, thereby producing gain.

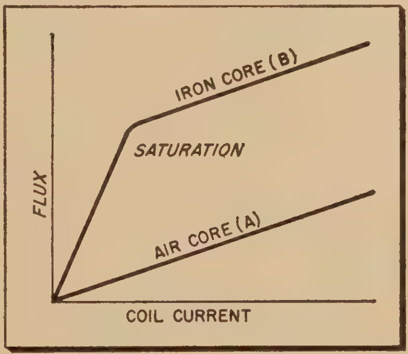


Fig. 3—Impedance depends upon rate-of-change of flux intensity. Iron core coil shows maximum impedance up to the point of saturation.

Reactors

A reactor in its simplest form is shown in Fig. 2. When connected in an a-c circuit its lines of flux change direction each time the applied voltage changes polarity. The opposition (impedance) to this change depends upon the rate of change of polarity (frequency) and the relative number of lines produced for a given current (inductance). Thus, if the frequency of the applied voltage is constant, the iron-core coil, having greater inductance, has a higher value of impedance than the air-core coil.

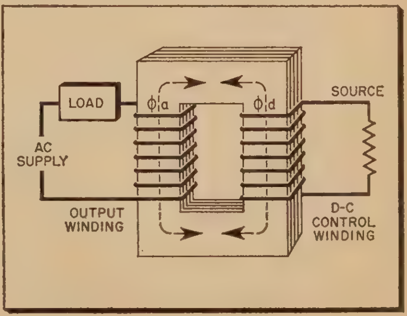
If the voltage applied to the iron-core coil is sufficient to drive the core beyond saturation, the impedance becomes equivalent to that of an air-core coil. Since impedance depends upon the rate-of-change of flux intensity, the curve for the iron-core coil, in Fig. 3, indicates maximum impedance up to the point of saturation. Beyond saturation the rate-of-change for both the air core and iron core coil is the same. Because current flow depends upon both the impedance and applied voltage, a relatively small increase in current takes place in the iron coil up to the saturation point. Beyond this point current increases rapidly with increases in applied voltage.

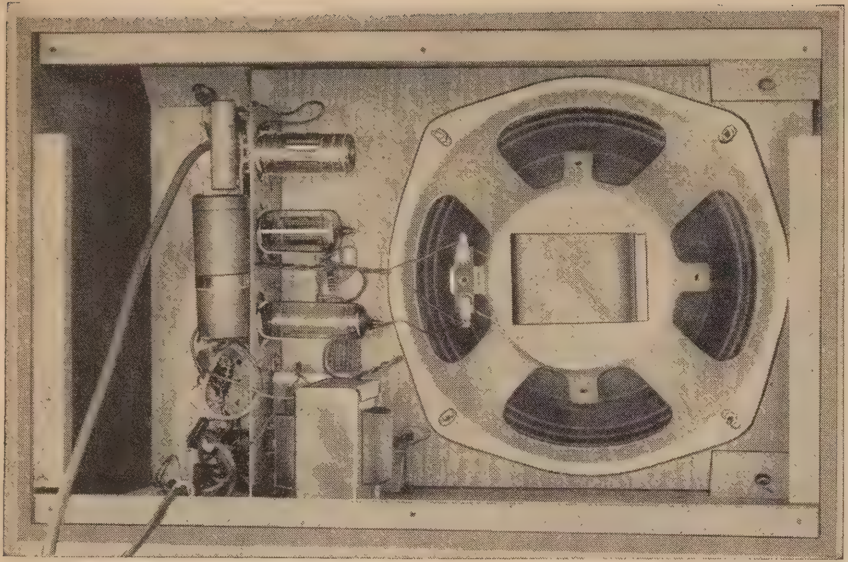
Saturable Reactors

In a saturable reactor the degree of saturation can be independently controlled. The reactor shown in Fig. 4 is similar to the one shown in Fig. 2, except that a second winding

(Continued on page 78)

Fig. 4—A control winding placed on the core of a saturable reactor controls the degree of saturation.





SALO NACHTIGALL
PRESIDENT
FANON ELECTRIC CO.

Fig. 1—Stereo conversion unit is complete with amplifier, dual-concentric mounted speakers, cabinet and extension cable. Just plug this compact unit into a jack which leads to the second channel of a stereo cartridge.

Low-Cost Stereo Conversion

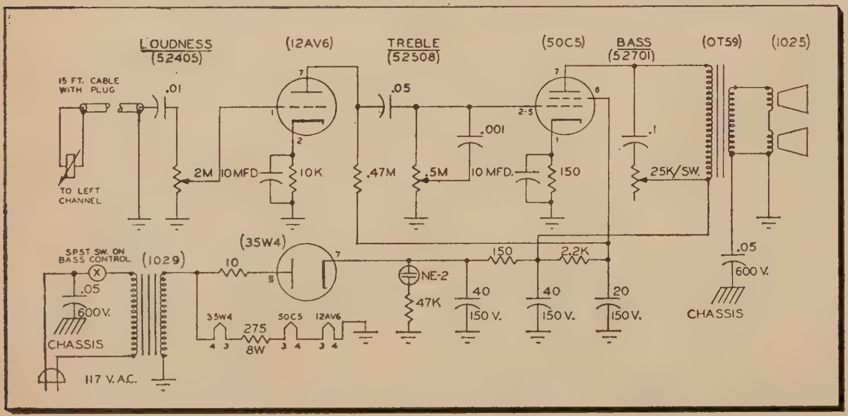
Cash In On The Stereo Mass Market. Attract Customers Who Don't Want To Discard The Not-So-Old Record Player

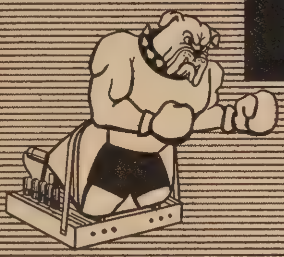
• Here's how to cash in on the mass stereo sound market. Arrival of the stereo phono discs has opened a new and profitable business activity for the service technician. Converting millions of monophonic phonos to stereo, and the sale of related equipment will do much to help burn the mortgage. Not every record player owner is a potential customer for stereo conversion, but even a small percentage of them represents a substantial increase in income.

A number of packaged kits are available which are designed to simplify conversion, and to do it at a mass-market price. Not only is the time element reduced with the use of these kits, but certain inherent problems of stereo conversion have been considered and compensated for, to minimize or eliminate a good deal of cut and try activity. These kits range in list price from about $40 to $60, and include a stereo cartridge, speaker, amplifier, accessories and cabinet. To simplify matters still further, the amplifier, and a one or two-speaker system are usually contained within a single finished cabinet; see Fig. 1. The moderately-priced ceramic stereo cartridge is designed to replace most of the monophonic cartridges found in the millions of popular phonographs. Even mounting lugs, phono jack, wire and cable are included. Because the kits are advertised to the consumer at list price, the technician can profit from the

(Continued on page 80)

Fig. 2—Two stage amplifier circuit is sufficient to handle the output from a stereo ceramic cartridge. Power transformer minimizes problems of interconnections with another ac/dc chassis and helps to reduce shock hazard incidence.


LOUDNESS (52405)
(12AV6)
TREBLE (52508)
(50C5)
BASS (52701)
(OT59)
(1025)
15 FT. CABLE WITH PLUG
.01
.05
.001
.1
TO LEFT CHANNEL
2M
10MFD
10K
.47M
.5M
10 MFD.
150
25K/SW.
(35W4)
SPST SW. ON BASS CONTROL
(1029)
10
NE-2
47K
150
2.2K
40
150 V.
40
150 V.
20
150 V.
.05
600 V.
CHASSIS
.05
600V.
CHASSIS
117 V.A.C.
35W4
275
8W
50C5
12AV6



"Tough Dog" Corner

Difficult Service Jobs Described by Readers

Annual Intermittent

This Admiral 19SZ4D chassis first came to my attention about a year ago. Several symptoms were present at that time, and all of them intermittent. Vertical size and linearity would drop, and the set would lose horizontal hold. This trouble was traced to an intermittent ground connection between the printed circuit board and the main chassis.

A few days later, I received another call, the picture was rolling and there were weaving vertical lines. I could find nothing wrong on this second trip, the set operated normally. A whole year passed before I was called again. The set had the same trouble as before, and in addition the raster had a pronounced blink. I loaned the customer a set and brought the chassis to the shop. To my dismay, the set worked perfectly for one full week. During the second week, I managed to isolate the trouble to the video amplifier. I checked all the component parts in the plate, screen, cathode, and control grid circuits of the 6AW8. While checking I found a negative 1.5 volts on the grid of the 6AW8. This was about 1 volt more negative than the schematic called for. I discounted this because my shop is in a high signal area, and also because the bias of this stage depends upon incoming signal.

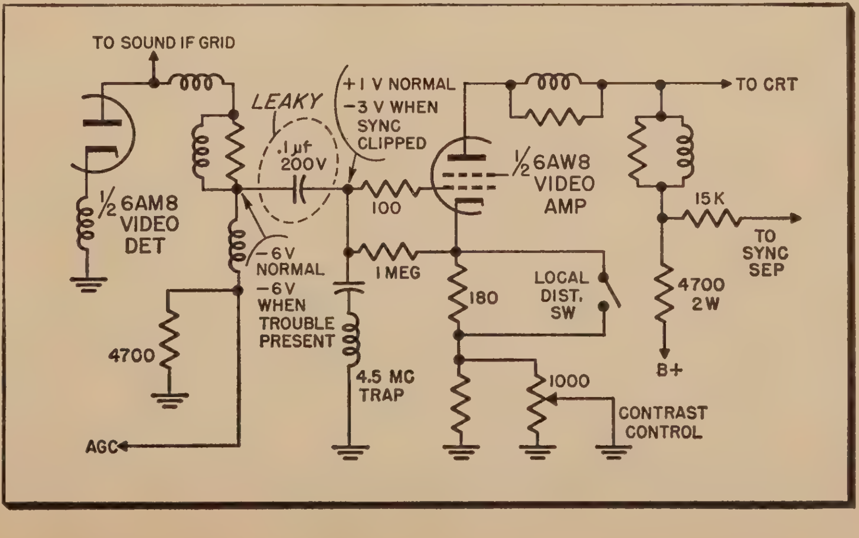
After several more days of fruitless study, I measured the bias voltage again, immediately after the set was turned on for the first time that day. I found it to be 1-volt positive. Checking further, I found the contrast control varied this voltage, but the voltage was always positive, when the picture was straight and the sync pulses were not compressed. After about another 2 hours of playing time, I again checked the set. The troublesome symptoms were present. Now the grid was nearly 3-volts negative. Then I found it, the coupling capacitor between the video detector and the 6AW8 grid was leaking. It placed a negative 4 volts on the grid, and caused the sync pulse to be clipped. This capacitor is 0.1 µf, 200-volt unit. Probably, not one in a million would ever break down with only 7 to 10 volts across it, but I had to have the one that did. —*Horace Lasher, Cleveland, Ohio.*

Horizontal Hum

The following is an account of a Tough Dog I have recently encountered. It was an RCA Canadian model, 16T11. The picture had a severe bend indicating trouble in or about the horizontal sweep circuits. The trouble was localized to the horizontal oscillator stage by grounding the horizontal sync pulse and carefully manipulating the horizontal hold control.

The cathode of the horizontal oscillator, in this receiver, is grounded. The cathode was connected to the low side of the filament and then to the chassis by way of a two-inch piece of wire. A screwdriver to ground at the cathode cleared the trouble. This seemed most unusual as the filament voltage was within tolerance and operating normally. A very close resistance check between cathode and ground showed about 0.2 ohms. The scope on this supposedly grounded cathode showed a healthy sine wave.

It seems as though this small resistance was enough to permit the hum to develop, but not enough to appreciably affect the heater. The hum signal thus impressed on the cathode was amplified by the tube and was responsible for some rather disquieting moments. Simply replacing the wire cured the trouble.—*W. Peter Jentzel, Youngs Point, Ontario, Canada.*



Leaky coupling capacitor placed a small negative voltage on the grid of the video amplifier. Intermittent sync compression took a year to expose itself to capture.

1959 Parts Show Preview

12,000 Industry Visitors To See Latest Products On Display

• This year, as in 21 preceding years, the Electronic Parts Distributors Show will serve as the market place for manufacturers to show their wares to distributors from all parts of the country. These distributors will carry product data from 269 exhibitors back to their home towns, informing service technician customers of the latest components and equipment available.

The Parts Show will be held in Chicago's Conrad Hilton Hotel, May 18-20, during the city's proclaimed Electronics Week. Some 12,000 visitors are expected. Registration is in advance of the Show, and admission is by badge only, issued in the following categories:

Exhibitors; Distributors; Commercial Sound & Hi-Fi Specialists; Sales Representatives; Government Personnel; Advertising & Export Agencies; and Industrial Accounts.

Show Sponsors

The five trade associations sponsoring the non-profit operator of the Show, the Electronic Industry Show Corp., are:

Electronic Industries Assoc. (EIA)

National Electronic Distributors Assoc. (NEDA)

Assoc. of Electronic Parts & Equipment Mfrs. (EP&EM)

West Coast Electronic Mfrs. Assoc. (WCEMA)

Producers of Associated Components for Electronics (PACE)

Of notable interest at the 1959 Parts Show is the establishment of a 6-hour Workshop Conference Program to educate distributors. Topics covered include: Financial Control; Inventory Control; Sales Control; Manufacturer-Distributor-Customer Relationships; and Time Control. •

1959 Parts Show
DATE: May 18-20, 1959
TIME: 9AM to 6PM
PLACE: Conrad Hilton Hotel, Chicago, Ill.

LIST OF EXHIBITORS

Company	Booth	Room
Advance Relays	122	
Aerovox Corp.	410	
Affiliated Television Labs.		663
Akro-Mils	890	
All Channel Products Corp.	115	
Alliance Mfg. Co.	221	
Alpha Wire Corp.	412	
Alto Fonic Music Systems, Inc.		614A-615A
American Electronics (N. Y. C.)	778	
American Electronics (L. A.)		504A
American Geloso Electronics		622A
American Radio Relay League		668
American Standard TV Tube	788	
American Television & Radio Co.	583	
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Amperite Co.	581	
Ampex Corp.		563A
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Antenna Specialists Co.	7	
Arco Electronics	401	
Argos Products Co.		521A
Arkay Div. of Radio Kits	776	
Astatic Corp.	779	505-507
Astron Corp.	775	
Atlas Sound Corp.	222	
Audio Devices	421	637A
Audio Fidelity		645A
Audiogersh Corp.		548A
Audio Tex Div (American Mike)		622A
Belden Mfg. Co.	210	
Bell Sound Systems		650A & 652A
Birnbach Radio Co.	111	
B & K Mfg. Co.		547
Blonder-Tongue Labs.	313	
Bogen-Presto		524A & 526A
Boulevard Electronics		663A
British Industries Corp.	211	509A
Bud Radio		605-607
Burgess Battery Co.	319	
Bussmann Mfg. Div.	311	
Cannon Electric Co.	681	
Carter Parts Co.	3	
CBS-Hytron Sales Corp.	314	
Central Electronics		520
Centralab Div.	790	
Channel Master Corp.		617A
Chemtronics	8	
Chicago Standard Transformer Corp.	312	
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Crest Transformer		617
Crown Records	888	
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Dynamic Electronics N. Y.		604A
Dynaco		628A
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Educational Electronics Co.	880	
Eldico Electronic Div.		523
Electro Products Labs.	586	
Electronic Instruments Co.	202	612A
Electronic Measurements Corp.	112	
Electrophono & Parts Corp.		643
Electronic Publishing Co.		618-619
Electronic Technician	584	
Electronic Utilities Co.	881	626
Electro-Voice		550A-551A
Electrovox Co.	402	

Visit
ELECTRONIC TECHNICIAN
at the Parts Show
Booth 584

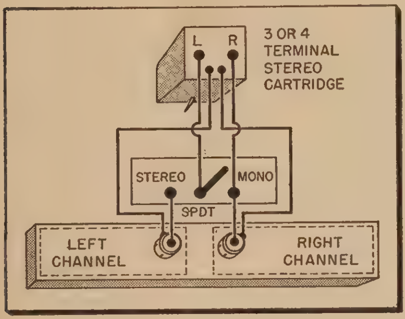
(Continued on page 72)

SHOP HINTS

Tips for Home and Bench Service

Stereo—Mono Switch

Stereo cartridges are purposely designed to have almost as much vertical compliance as horizontal compliance, and to provide an output signal in response to vertical vibrations. This is fine for stereo discs; but for monophonic records, the only information in the vertical plane is undesirable noise and rumble. By paralleling the two elements in most stereo cartridges, the cartridge becomes insensitive to vertical motion. This is a fortunate circumstance, and is due to the fact that a strictly vertical stylus movement causes an output signal in each cartridge element that is equal, but 180° out-of-phase.



SPDT switch parallels both elements in stereo cartridge for monophonic records without shorting the mono input of some stereo preamps.

Many of the newer record changers are already equipped with SPST switch mounted close to the pickup arm, to parallel the cartridge output signals. There are millions of record changers that will be modified for stereo over the next year or two. It is even more desirable to install such a switch on the older players because not as much attention was paid to vertical rumble before the days of the stereo disc.

Some of the stereo preamps short out the input of the channel not in use, when the system is set for monophonic operation. If the stereo cartridge output is then paralleled the signal would be lost. A SPDT, instead of SPST, switch connected as shown can eliminate this problem. It disconnects the unused and grounded channel from the cartridge. —*Harold D. Mohr, Gahanna, Ohio.*

SHOP HINTS WANTED!

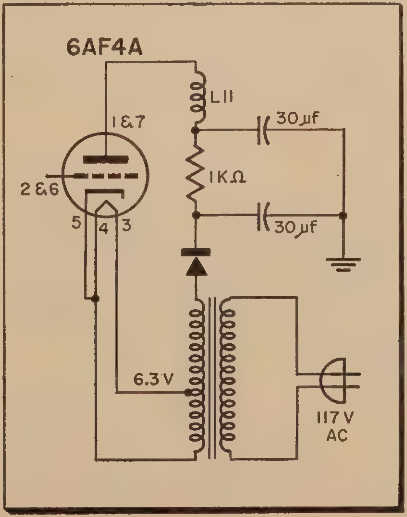
$3 to $10 for acceptable items. Use drawings to illustrate whenever necessary. A rough sketch will do. Photos are desirable. Unacceptable items will be returned. Send your entries to "Shop Hints" Editor, ELECTRONIC TECHNICIAN, 480 Lexington Ave., New York 17, N. Y.

Converter Hum

Out here in Oregon, many people depend upon translator service for TV reception. Many technicians here use the Blonder-Tongue BTU-2 converter. A few of them have been very difficult and sometimes impossible to tune. Hum bars in the picture and a roar in the sound would develop when a station was tuned in.

In the last 15 months, many man hours were spent attempting to devise a filter, or to find some other answer to this problem. When I found the answer, it was so simple, it was no wonder that it had been overlooked. The trouble was in the 6AF4 heater circuit. The defective converter had the cathode, pin 5, attached to the heater, pin 3. This placed 6.3 volts ac on the cathode. Simply connecting the cathode to the other side of the heater, pin 5, corrected the trouble, as shown in the simplified diagram.—*Al Stohler, Cottage Grove, Oregon.*

Improper cathode connection injected A-C heater voltage into system. Connect as shown.

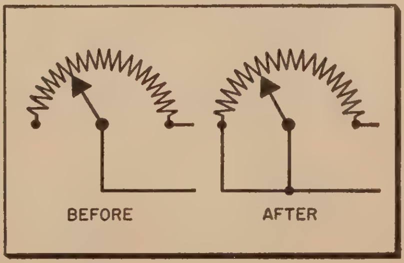


Manufacturers recommendations for correct heater and cathode connections in the BTU-2B and BTU-2R converters are shown in the accompanying illustration. Much time can often be saved by consulting the manufacturer.—Ed.

Quieting Controls

Potentiometers are often used as two-terminaled controls in many TV, audio, and other electronic equipment. Noisy controls are quite common, regardless of how they are used. Quieter operation and longer control life can be realized by connecting the unused terminal to the center control arm as shown in the diagram. Should the arm fail to make a good contact, while it is being rotated, the entire pot is in the circuit, arcing tendencies and current surges are thus minimized. The unused portion of the resistance is shorted to the control arm, and does not affect the circuit in any way—*Harold D. Mohr, Gahanna, Ohio.*

Less noise, and greater life expectancy can be obtained from potentiometers used in 2-terminal hookups, by connecting the unused terminal to the center arm.



An authoritative answer to a ticklish consumer question . . .

ELECTRONIC TECHNICIAN has prepared the following bulletin as an aid to better customer relations. When an estimate can not be provided in the home, give your customer a copy. Reprint this bulletin yourself, or order extra copies postpaid from ELECTRONIC TECHNICIAN, 480 Lexington Ave., New York 17, N.Y. Price is $1 for first 100 copies; 50¢ additional 100's.

Why Can't You Give Me a TV Repair Estimate Right Now?

Every day many TV set owners ask this of their service technicians. It's a fair question. Here's the answer.

By their very nature, electronic parts—even the best made parts—are subject to unexpected failure at any time. A typical TV receiver contains over 585 separate tubes and components plus thousands of feet of wire. When a certain few of these components break down, they produce symptoms that sometimes are immediately traceable to the respective parts. When this happens, your TV technician can give you an estimate—and frequently even repair the set—immediately, right in your own home.

However, most of the 585 parts can cause symptoms identical with other parts. No guess work here, because a 25¢ resistor can cause the same apparent symptoms as a $25 transformer! To locate the troublesome part or parts requires costly and bulky test instruments frequently found only in the repair shop. So your service technician often cannot give you an estimate until your set is examined at the test bench to determine the cause of the failure and the cost of replacing the part that failed.

Your service technician wants you as a customer. All TV sets require periodic repair. To hold your good will for future business, he wants to give you an accurate estimate based on instrument tests, not guesswork. Unfortunately, it is often not technically possible for him to do so "right now"—in your home—much as he desires to please you.

Prepared as a public service by

ELECTRONIC TECHNICIAN

World's Largest Electronic Trade Circulation

1959
ELECTRONIC TECHNICIAN BUYERS DIRECTORY

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480 Lexington Ave., New York 17, N.Y.

1959 ELECTRONIC TECHNICIAN BUYERS DIRECTORY

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Product Finding Index

A fast reference guide that enables you to find the product you want in the *Product Directory*—quickly. Here's how to use the *Product Finding Index:* (1) Look for the product you want (under the name you ordinarily use to identify it). (2) Turn to the section number given in the *Product Finding Index.* (3) From the manufacturers listed in this section, select only those with the code numbers (listed in the *Product Finding Index)* after their names. These are the manufacturers of the products you want. Major classifications, under which products are listed, are in capital letters.

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1959 ELECTRONIC TECHNICIAN BUYERS DIRECTORY

Product Listings

This is a complete listing of all service and replacement products, component parts, equipment, instruments, and materials in the radio-TV-electronic service industry—with the names of the companies that make them. Product categories are arranged according to major group headings. Manufacturers are listed alphabetically under these groups. Manufacturer address list starts on page 48.

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Advance Electronics-4-16
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Amperite Co-5
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Arco Transformer & Electric-1-2-6-8-9-10-11
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Brach Mfg-13
Browning Labs-3-4
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Chicago Standard Transformer-1-3-6-7-8-9-10-11-15
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Coil Co of America-1-2-3-6-8-10
Coil Winders Inc-1-2-3-4-6-7-8-9-10-12-13-14-15
Colman Electronic Prods-2
Community Eng'g-4
Cornell-Dubilier Electric-4
Cutler-Hammer-5

Daven Co-4
Davis Electronics-2
Delco Radio-1-11
Dinion Coil-6-8-10-11
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Dynaco Inc-6
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Jensen Mfg-9
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Krohn-Hite Corp-3
Kuhn Electronics-2
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Langevin Div W L Maxson-1-3-6-7-8-9-10-11
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Magnadyne Corp-5
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Mid-West Coil & Transformer-6-8-9-10-11-12
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Bogue Electric-4
Browning Labs-1-12
Budelman Electronic-7-12
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Heath Co-3-8-9-11-12-14-15-17
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Mallory & Co Inc PR-4
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Converters	4
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Inverters	6
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Power supply filters	8
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Aerovox Corp-7-8
Allied Radio-2
Altec Lansing-7-9
American Electronics-4
American Elite-11
American TV & Radio-2-4-6-10
Associated Specialties-7

Baird-Atomic Inc-7
Barry Electronics-5-7-8
Bergen Labs-7-11
Berger Communications-6
Blonder-Tongue-4-8
Bogue Electric Mfg-2-4-6-7-9-11
Brach Mfg-11
Bright Star Industries-1
Browning Labs--7-8
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Chicago Standard Transformer-11
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Clegg Labs-7
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Electric Storage Battery-1-2
Electromatic Industries-11

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Electronic Instruments-2-3-7-9
Electronic Measurements-2
Electronic Utilities-1
Electro Products-2-7
Electro-Tech Equip-7-11
Entron Inc-3-7
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Foto-Video Labs-7-8-9-11

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Gulton Industries-1-2-6-7-8-9

Heath Co-2-4-7-8-9
Hewlett-Packard-7-9
Hoffman Electronics (Evanston)-11

IDEA Inc-4
Int'l Crystal-4
Int'l Rectifier-11

Johnson Co E F-4

Kepco Inc-2-7-9-11
Krohn-Hite Corp-7
Kuhn Electronics-4

LEE Inc-7

Mallory & Co Inc P R-1-2-10
Marathon Battery-1
Marco Industries-5
Merit Coil & Transformer-8
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Millen Mfg Co James-7
Miller Co Sanford-7-8
Moran Products-7
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National Carbon Co-1
North Electric-7-8-9

Packard-Bell-4-7-9
Paco Electronics-2
Perma-Power Co-2-9
Peschel Electronics-7
Philco Corp-1-10
Plastic Capacitors-7-8
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Racon Electric-10
Radiart Corp-2-6-10
Radio City Prods-7
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Raytheon Mfg (Newton)-11
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Relay Sales-11
Riemer Co David-2

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Saratoga Industries-2-7-8-9-11
Schauer Mfg-2
Scott Inc H H-7
Seco Mfg-2-7
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Simpson Mfg Mark-4
Skysweeper Inc-9
Sonex Inc-7
Sonotone Corp-1-2-4
Sorensen & Co-2-4-6-7-8-11
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Superior Electric-11
Sylvania Electric Prods-11

Telectro Industries-7-8-9
Tel-Instrument Electronics-11
Telkor Inc-2-4-6-10
Terado Co-2-4-6
Trans Electronics-7-9
Transitron Electronic-11
Triad Transformer-8-10

United Motors Service-10

Universal Transistor Prods-4-5-7-10

Valor Electronics-7-9-11
Vokar Products-10

Yardney Electric-1-2

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Receivers & meters, coin operated	4
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American Geloso-3
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Andrea Radio-3-6
Argonne Electronics-3-5
Arvin Industries-3
Automatic Radio-3

Berger Communications-4-5
Blonder-Tongue-1-2-3-7
Bogen-Presto-3
Browning Labs-3

Cal-Lee Mfg-3
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Channel Master Corp-3
Circuit Mfg Co-1
Community Eng'g-2
Continental Mfg-3-5

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Fisher Radio-3

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GiantView TV Network-5-6
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Heath Co-3
Hoffman Electronics (Los Angeles)-6

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MusiCall Corp-3

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North Electric-5

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Telematic Industries-2-3
Teletone Co-3
Tenna Mfg-1

Vidaire Electronics-1

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Ballasts	2
Controls, volume	3
Potentiometers	4
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Carbon composition	5
Deposited film	6
Fuse	7
Photo-sensitive	14
Plastic	9
Variable	10
Wirewound	11
Rheostats	12
Thermistors & varistors	13

Aerovox Corp-1-3-4-6-11
Amperite Co-2
Argonne Electronics-1-4
Arnhold Ceramics-6

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Bourns Labs-4-10-12

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Chicago Telephone Supply-3-6-10-11-12
Clarostat Mfg Co-1-2-3-4-6-7-10-11-12
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Coil Co of America-2
Coil Winders Inc-1
Community Eng'g-1
Continental Mfg-3

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Daven Co-1-6-10-11-12
Delco Radio-3
DeRo Electronics-1-7

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Electro-Tech Equip-12
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Saxton Products-1
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Tel-Instrument Electronics-6
Telonic Industries-6
Tenna Mfg-7
Trans Electronics-23
Triplett Electrical Instrument-6-11-12-17-23-24

United Motors Service-23
Universal Circuit Controls-16
U-Test-M Mfg-17-24-25-26

Valor Electronics-1-23
Van Norman Industries-5-6-11
Vemaline Products-16
Vidaire Electronics-5-14
Vis-U-All Products-14-24-25-26

Waldom Electronics-11
Waterman Products-12
Waters Mfg-12
Western Coil & Elec-6
Weston Instruments-1-11-12-18-24
Winston Electronics-1

12—TOOLS & SHOP AIDS

Alignment tools ...1
Benches, work 2
Bins 3
Blow torches 4
Cabinets, racks ...5
Caddies 6
Carts, dollies & hand trucks 7
Cradles, chassis ...8
Crimping & lug tools 9
Electric tools, drills, etc. 10
Hand tools, saws, etc. 11
Ladders 12
Pliers, cutters 13
Printed circuit repair kits 14
Screwdrivers, nutdrivers 15
Service lamps 16
Soldering guns, irons 17
Staplers 18
Tables, TV 19
Tool accessories ..20
Tube pin straighteners ..21
Tube pullers 22
Wire strippers ...23

Aerolite Electronics-1
Akro-Mils Inc-3-5
Altec Lansing-5
Alva Allen Industries-11
American Elec Heater-7
Anchor Metal-7
Anchor Prods-17
Argos Prods-6
Arrow Fastener-18
Atlas Mfg-17

Baumker Mfg-2-5-8
Birnbach Radio-23
Black & Decker-10
Blonder-Tongue-23
British Electronic Sales-21-22
British Industries-5

Cabinart Inc-5
Carpenter Mfg-23
Champion DeArment Tool-11-13
Cummins Portable Tools-10

Drake Electric Works-17
Dreier Bros-11

Electric Soldering Iron-17
Electro-Tech Equip-17
Entron Inc-1
Equipto-2-3-5-7
Ercona Corp-21-22
Erie Resistor-5
Erwood Inc-5

Fairbanks Co-7
Fedtro Inc-17

General Cement Mfg-1-8-14-15-16-18-21-22-23
General Electric Apparatus Sales Div (Schenectady)-17
Greene Co L Charlton-5
Greenlee Bros-11
Gregg Electric-17

Hamer-Dril Co-11
Heath Co-11
Hexacon Electric-17
Holub Industries-23
Hubbell Inc Harvey-9
Hunter Sales Co R N-1-11-13-15-20-22-23

Ideal Industries-7-23

Jansa Woodworking-5
JFD Electronics-1-20-23

Keystone Electronics-1-19
Kleer-Vue Mfg-5
Klein & Sons Mathias-11-13
Kraeuter & Co-11-13
Kwikheat Mfg-17

Leitch-Huard Corp-5
Lenk Mfg Co-17
LI Electro-Labs-17
Luxo Lamp-20

Markell Assoc Jeff-5
Mastra Co-6
Millers Falls Co-10-11
Milwaukee Truck-7
Mitchell Industries-17
Mobil Electronics-5
Moody Mach Prods-15
Muckle Mfg-5

Neumade Prods-5
Newcomb Audio Prods-5
Newman Corp M M-17

Oryx Co-17

Packard-Bell-19
Peerless Prods-19
Pipestone Sales-12
Portable Elec Tools-10-11-17
Powers Co J J-5
Premier Metal Prods-5
Price & Rutzebeck-11
Proto Tool-11-13-15-23

Radio Merchandise Sales-6
Rimak Inc-4-5-8
Robertson & Ruth-20
Roche Co Paul C-17
Rogers Mfg-8
Rye Sound-17

Safety Nail Driver-11
Saxton Products-1
Scott Inc H H-1
Scranton Aluminum-12
Service Parts Systems-3
Sidco-17
Smolin Labs-14
South River Metal Prods-12
Standard Pressed Steel-2-3-5-7
Stromberg-Carlson-5
Sylvania Electric Prods-6

Technicraft Co-11-17
Techniques Inc-14
Telectro Industries-1
Tenna Mfg Co-14
Tipco Mfg-15-20
TV Hdw Mfg-14-20

Ungar Electric Tools-17
U-Test-M Mfg-21
Utica Drop Forge & Tool-13-15

Vaco Products-1-9-11-13-15-20
Vis-U-All Products-6

Waber Electronics-20
Waldom Electronics-19
Wassco Elec Products-17
Weller Electric-17
Wen Products-10-11-17
Werner Co R D-12
Workman TV-1-21

Xcelite Inc-13-15

Yeats Appliance-7

13—TUBES & SEMI-CONDUCTORS

Diodes & rectifiers:
Crystal 1
Germanium 2
Selenium 3
Silicon 4
Rectifiers, copper ..5
Solar cells 14
Transistors 6
Tubes:
Cathode-ray 7
Geiger counter ..8
Industrial, special purpose 9
Photoelectric ...10
Receiving & audio 11
Thyratron, ignitron, control .12
Transmitting ...13

Allen Electronics-7
American Elite-2-7-9-11-13
Amperex Electronic-8-9-11-12-13
Anton Electronic-8-9
Audio Devices-4

Baird-Atomic-9
Barry Electronics-1-2-3-4-6-7-8-9-10-11-12-13
Bogue Electric-3-4-6
Bomac Labs-4
British Industries-8-9-11-12-13

Calvideo Tube-7
CBS-Hytron-2-4-6-7-9-10-11-12-13
Central Electronic-9-13
Channel Master Corp-11
Claremont Tube-7
Clevite Transistor Prods-2-4-6
Conant Labs-3-5
Continental Electric-4-9-10-12-13
Continental Electronics-7-8

Delco Radio-6
Dutrex Industries-7-11

Eitel-McCullough-9-13
Electronic Devel Assoc-7-10-13
Electronic Devices-3
Electronic Utilities-1-2-4-6-9-11
Electron-Radar Prods-10
Electrons Inc-9-12
Electro-Tech Equip-5
Erie Resistor-2

Finney Co-1-2-3-4

General Electric Apparatus Sales Div (Schenectady)-3-4-10
General Electric Receiving Tube Div (Owensboro)-6-7-9-11-12-13
General Electric Semiconductor Prods Dept (Syracuse)-2-3-4-5-6
General Instrument-2-3-4-5
General Transistor-2-6
Great Eastern Mfg-1-2-3-4-6
Gulton Industries-6

Hi-Glo Electronics-7-9
Hoffman Electronics (Evanston)-4
Hughes Products-1-2-4-8-9-11-12-13

Industro Transistor-6
Intelex Systems-9-11
Int'l Electronic-11
Int'l Rectifier-2-3-4-14
Int'l Resistance-3
ITT Components 3-4

Kemtron Electron Prods-1-2-4
Kriss Electronics-7-9

Mallory & Co Inc P R-5
Metropolitan Supply-9-10-11-12-13
Miller Co Sanford-3-4
Minn-Honeywell Regulator-6
Motorola Inc (Phoenix)-4-6

National TV Tube-7
New England Electronic-7

Ohmite Mfg Co-2

Philco Corp-1-2-3-4-5-6-7-9-11
Photo Crystals-10
Pyramid Electric-3-4

Radio Corp of America (Harrison)-1-2-4-6-7-9-10-11-12-13
Radio Receptor-2-3-4
Rauland Corp-7
Raytheon Mfg (Newton)-1-2-4-6-7-8-9-11-12-13
Raytheon Mfg (Waltham)-1-2-4

Schauer Mfg-5
Semi-Elements Inc-1-2-3-4-6
Sonotone Corp-9-11
Sprague Products-6
Superior Electric-9
Sylvania Electric Prods-1-2-3-4-6-7-9-10-11-12-13

Tarzian Inc Sarkes-3-4
Texas Instruments-4-6
Transitron Electronic-2-4-6
Tung-Sol Electric-1-3-4-6-7-9-11-12-13

Ultravision Mfg-7
United Motors Service-6-11

Waterman Products-7
Westinghouse Electric (Elmira)-7-9-11-12-13
Workman TV-6

Zalytron Tube-11

Paid Circulation of
ELECTRONIC TECHNICIAN
OVER 80,000*
World's Largest Electronic Trade Circulation
*Publisher's estimate, subject to ABC audit

1959 ELECTRONIC TECHNICIAN BUYERS DIRECTORY

Alphabetical Listing of Manufacturers

A complete listing of the names and addresses of manufacturers of service and replacement products, component parts, equipment, instruments and materials as well as technical publishers.

Accurate Electronics Corp 169 S Abbe Rd Elyria Ohio
Acme Electric Corp Water St Cuba NY
Acme Model Eng'g Co 6224 15 Ave Brooklyn 19 NY
Acoustica Associates 26 Windsor Ave Mineola 11 NY
Acoustica Research 24 Thorndike St Cambridge 41 Mass
Aero Products Co 369 Shurs Lane Philadephia Pa
Adler Electronics 1 LeFevre Lane New Rochelle NY
Admiral Corp 3800 W Cortland St Chicago 47 Ill
Advance Electronics 8510 North End Ave Oak Park 37 Mich
Advanced Acoustics 1875 Carter Ave New York 72 NY
Aerolite Electronics 2207 Summit Ave Union City NJ
Aerovox Corp 740 Belleville Ave New Bedford Mass
Affiliated Television Labs 112-07 Francis Lewis Blvd Queens Village 29 NY
A-K Mfg Co 115 S Northwest Hwy Barrington Ill
Akro-Mils Inc 820 E Market St Akron 5 Ohio
Alco Electronics Mfg Co 3 Wolcott Ave Lawrence Mass
All Channel Prods 47-39 49 St Woodside 77 NY
Allen Electronics 92 Branch St Pontiac Mich
Alliance Mfg Co Alliance Ohio
Allied Engraving & Stamping 17 Elm St Buffalo 3 NY
Allied Radio Corp 100 N Western Ave Chicago 80 Ill
All Products Co Box 110 Mineral Wells Texas
All Weather Antennas 350 S Egg Harbor Hammonton 1 NJ
Alonge Products Inc 163 W 23 St New York 11 NY
Alpha Metals Inc 56 Water St Jersey City 4 NJ
Alpha Wire Corp 200 Warick St New York 14 NY
Altec Lansing 1515 S Manchester Ave Anaheim Calif
Alva Allen Industries Clinton Mo
American-Concertone Div American Electronics Inc 9449 W Jefferson Blvd Culver City Calif
American Electrical Heater Co 6110 Cass Ave Detroit 2 Mich
American Electronics 1203 Bryant Ave New York 59 NY
American Elite 48-50 34 St Long Island City 1 NY
American Geloso Electronics 251 4 Ave New York 10 NY
American Microphone 412 S Wyman St Rockford Ill
American Radio Relay League West Hartford Conn
American Smelting & Refining Federated Metals Div 120 Broadway New York 5 NY
American Solder & Flux 19 & Willard Philadelphia 40 Pa
American Tower Co Box 29 Shelby Ohio
American TV & Radio 300 E 4 St St Paul 1 Minn
Amperex Electronic Corp 230 Duffy Ave Hicksville LI NY
Amperite Co 561 Broadway New York 12 NY
Ampex Audio Inc 1020 Kifer Rd Sunnyvale Calif
Amphenol-Borg Electronics 1830 S 54 Ave Chicago Ill
Amplifier Corp of America 358 Bdwy New York 13 NY
Amplitel Inc 342 W 40 St New York 18 NY
Anchor Metal Co 966 Meeker Ave Brooklyn 22 NY
Anchor Products 2712 W Montrose Ave Chicago 18 Ill
Anchor Wire Corp 183-16 Jamaica Ave Jamaica 23 NY
Andrea Radio 27-01 Bridge Pl N Long Island City 1 NY
Anko Mfg Co 5025 N 124 St Milwaukee 18 Wis
Ansley Mfg Co Arthur New Hope Pa
Ansonia Wire & Cable Co 111 Martin St Ashton RI
Antenna Designs 225 S 3 St Burlington Iowa
Antenna Products 3753 Clark St Chicago 13 Ill
Antenna Specialists 12435 Euclid Ave Cleveland 6 Ohio
Anton Electronic Labs 1226 Flushing Ave Brooklyn 37 NY
Apparatus Devel Co 115 Main St Wethersfield 9 Conn
Applied Electronics 213 E Grand Ave S San Francisco Calif
Arco Electronics Inc 64 White St New York 13 NY
Arco Transformer 1602 S Hanna St Fort Wayne 5 Ind
ARF Products Inc 7627 Lake St River Forest Ill
Argonne Electronics 165-11 South Rd Jamaica 33 NY
Argos Products Co 301 Main St Genoa Ill
Arkay Radio Kits 8806 Van Wyck Expressway Jamaica 18 NY
Armco Steel 703 Curtis St Middletown Ohio
Arnhold Ceramics I E 57 St New York 22 NY
Arrow Fastener Co 1 Junius St Brooklyn 12 NY
Artcorde Recorded Tape Box 561 Huntington NY
Arvin Industries Columbus Ind
Associated Specialties 1751 Main St Orefield Pa
Astatic Corp Conneaut Ohio
Astron Corp 255 Grant Ave East Newark NJ
Atlas E-E Corp 47 Prospect St Woburn Mass
Atlas Mfg 1126 S Decatur Montgomery 5 Ala
Atlas Sound Corp 1449 39 St Brooklyn 18 NY
Audax Inc. Div Rek-O-Kut Co 38-19 108 St Corona 68 NY
Audel & Co Theo 49 W 23 St New York 10 NY
Audio Devices Rectifier Div 620 E Dyer Rd Santa Ana Calif
Audio Devices Inc 444 Madison Ave New York 22 NY
Audio Fidelity Records 465 W 51 St New York NY
Audiogersh Corp 514 Broadway New York 12 NY
Audio Instrument Co 135 W 14 St New York 11 NY
Audio-Master Corp 17 E 45 St New York 17 NY
Autocrat Electronics Co 5024 Elm St Skokie 8 Ill
Automatic Radio Mfg 122 Brookline Ave Boston 15 Mass
Automatic Switch 50 Hanover Rd Florham Park NJ
Automation Labs 7230 Clinton Rd Upper Darby Pa
Aviation Electric 140 Green Lane Bedford Hills NY

Bache & Co Semon 636 Greenwich St New York 14 NY
Baird-Atomic Inc 33 University Rd Cambridge 38 Mass
Band-It Co 48 & Dahlia Sts Denver 16 Colo
Barco Chemical Prods 701 S LaSalle Chicago 5 Ill
Barker Sales 350 5 Ave New York 1 NY
Barker & Williamson 235 Fairfield Ave Upper Darby Pa
Barry Electronics 512 Broadway New York 12 NY
Baumker Mfg Co 3826 Summit St Toledo 11 Ohio
Beaver Labs 187-61 Hollis Ave Hollis 23 NY
Becker Electronics 1091 Rockaway Valley Stream NY
Beckman Instruments Berkeley Div 2200 Wright Ave Richmond 3 Calif
Beede Electrical Instrument Co Penacook NH
Belden Mfg Co 415 S Kilpatrick Ave Chicago 44 Ill
Bell & Howell 7100 McCormick Rd Chicago 45 Ill
Bell Sound Systems 555 Marion Rd Columbus 7 Ohio
Bendix Radio E Joppa Rd Towson 4 Md
Bennett & Co 230 E Ohio St Chicago 11 Ill
Bennett Labs 4224 Holden St Emeryville 8 Calif
Bergen Labs 247 Crooks Ave Clifton NJ
Berger Communications 109-01 72 Rd Forest Hills NY
Berkshire Labs 692 Bank Village Greenville NH
Biggs Co Carl H 1547 14 St Santa Monica Calif
Birnbach Radio Co 145 Hudson St New York 13 NY
BK Mfg Co 13 W Hubbard St Chicago 10 Ill
Black & Decker E Penna Ave Towson 4 Md
Blaco Mfg Co 6541 Euclid Ave Cleveland 3 Ohio
Blonder-Tongue Labs 9-25 Alling St Newark 2 NJ
B&M Electric Corp 168 7 St Brooklyn 15 NY
B&M Electronic Mfg Co 2516 Dodge Ave Ft Wayne Ind
Boetsch Bros 115 Cedar St New Rochelle NY
Bogen-Presto Div Siegler Corp P O Box 500 Paramus NJ
Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ
Bohn Sound Eng'g Lincoln Hwy E Ft Wayne 8 Ind
Bomac Labs Salem Rd Beverly Mass
Bourns Labs P O Box 2112 Riverside Calif
Bozak Sales Co R T Box 1166 Darien Conn
Brach Mfg Corp 200 Central Ave Newark 3 NJ
Bradford Audio Corp 27 E 38 St New York NY
Brady Co W H 727 W Glendale Ave Milwaukee 9 Wisc
Brand & Co Wm North & Valley Sts Willimantic Conn
Brand Products 11 Lorimer St Brooklyn NY
Bright Star Industries 600 Getty Ave Clifton NJ
British Electronic Sales Co Oakland Gardens Sta Flushing 64 NY
British Industries 80 Shore Rd Port Washington NY
Broadcast Equip Specialties PO Box 149 Beacon NY
Browning Labs 100 Union Ave Laconia NH
Budelman Electronic Corp 375 Fairfield Ave Stamford Conn
Bud Radio Inc 2118 E 55 St Cleveland 3 Ohio
Burgess Battery Div Servel Inc Freeport Ill
Burnell & Co 10 Pelham Pkwy Pelham Manor NY
Burroughs Corp 6071 2 Ave Detroit 32 Mich
Bushnell Electric Co 345 Hess St Bushnell Ill
Bussmann Mfg Div McGraw-Edison Co University at Jefferson St Louis 7 Mo

Cabinart Inc 35 Geyer St Haledon NJ
Calcon Mfg Co 100 Oakland Ave Washington Pa
Caldwell-Clements Manuals 480 Lexington New York 17 NY
Calex Mfg Inc 251 Dixon Ave Amityville NY
Califone Corp 1041 N Sycamore Ave Hollywood 38 Calif
Cal-Lee Mfg Co 6759 West Blvd Inglewood 3 Calif
Calvideo Tube Corp 18601 S Santa Fe Ave Compton Calif
Cannon Co C F Springwater NY
Cannon Electric 3208 Humboldt St Los Angeles 31 Calif
Capehart Corp 216 W 14 St New York 11 NY
Capitol Records Hollywood & Vine Hollywood 28 Calif
Capps & Co 20 Addison Pl Valley Stream NY
Carborundum Co Globar Plant Niagara Falls NY
Carling Electric 505 New Park Ave West Hartford Conn
Carpenter Mfg Co PO Box 217 DeWitt 14 NY
Carter Motor 2711 W George St Chicago 18 Ill
Castle TV Tuner Service 1723 W Lunt Ave Chicago Ill
CBC Electronics Co 2601 N Howard St Phila 33 Pa
CBS-Hytron 100 Endicott St Danvers Mass
Centralab 902 E Keefe Ave Milwaukee 1 Wis
Central Electronic 2 Richwood Pl Denville NJ
Central Electronics 1247 W Belmont Ave Chicago 13 Ill
Century Electronics Co 111 Roosevelt Ave Mineola NY
CGS Labs Routes 7 & 35 Ridgefield Conn
Champion DeArment Tool Co S Main St Meadville Pa
Channel Master Corp Ellenville NY
Charles Eng'g 6053½ Melrose Ave Los Angeles 38 Calif
Chemical Electronic Eng'g Matawan NJ
Chester Cable Corp Oakland Ave Chester NY
Chicago Standard Transformer 3501 W Addison Chicago
Chicago Telephone Sup 1142 W Beardsley Elkhart Ind
Christie Electric 3410 W 67 St Los Angeles 43 Calif
Cinch Mfg Corp 1026 S Homan Ave Chicago 24 Ill
Circon Component Corp Santa Barbara Municipal Airport Goleta Calif
Circuit Mfg 7800 River Rd North Bergen NJ
Cisin Harry G Amagansett NY
Claremont Tube 36-02 35 Ave Long Island City 6 NY
Clarostat Mfg Co Washington St Dover NH
Clear Beam Antenna 21341 Roscoe Canoga Park Calif
Clegg Labs Ridgedale Ave Morristown NJ
Cletron Inc 1974 E 65 St Cleveland 3 Ohio
Clevite Electronic Components 3311 Perkins Ave Cleveland 14 Ohio
Clevite Transistor Prods 241 Crescent Waltham 54 Mass
Clough-Brengle Co 6014 N Broadway Chicago 40 Ill
Coaxial Connector Co 37 N 2 Ave Mt Vernon NY
Coil Company of America 207 Washington St Northvale NJ
Coil Winders Inc New York Ave Westbury LI NY
Collaro (see Rockbar Corp)
Collins Radio Co Cedar Rapids Iowa
Colman Electronic Prods 1017 NE 3 Ave Armarillo Tex
Columbia Products Co Columbia SC
Columbia Records Inc 799 7 Ave New York 19 NY
Columbia Wire & Sup 2850 W Irving Park Rd Chicago
Communication Prods Mineral Wells Texas
Communications Co 300 Greco Ave Coral Gables Fla
Community Eng'g Box 824 State College Pa
Components Corp 106 Main St Denville NJ
Conant Labs Box 3997 Bethany Sta Lincoln 5 Neb
Concertapes Distrs 1010 Central Ave Wilmette Ill
Condenser Products 140 Hamilton St New Haven Conn
Conrac Inc 19217 Foothill Blvd Glendora Calif
Continental Carbon 5221 Greene St Philadelphia 44 Pa
Continental Electric 715 Hamilton St Geneva Ill
Continental Electronics 2724 Leonis Blvd Los Angeles
Continental Mfg 1612 California St Omaha 2 Nebr
Cook Labs 101 2 St Stamford Conn
Cornell-Dubilier Electric 333 Hamilton Blvd South Plainfield NJ
Cornish Wire Co 50 Church St New York 7 NY
Counterpoint Recordings 333 6 Ave New York 14 NY
Coyne Electrical School 1536 W Adams St Chicago Ill
Cummins Portable Tool 5055 N Lydell Milwaukee Wis
Cutler-Hammer Inc 386 N 12 St Milwaukee 1 Wis

Dage Electric Co 67 N 2 St Beech Grove Ind
Dage TV Div Thompson Products Michigan City Ind
Dale Products Box 136 Columbus Nebr
Dalmotron Co 534 Laurel St San Carlos Calif
Daven Co Route 10 Livingston NJ
Davis & Co JW 9212 Denton Drive Dallas 35 Tex
Davis Electronics 4002 Burbank Blvd Burbank Calif
Decca Records 445 Park Ave New York 22 NY
Delco Radio Div GMC 700 E Firmin St Kokomo Ind
Delmonico Int'l 42-24 Orchard St Long Island City NY
DeRo Electronics 134 Nassau Rd Roosevelt NY
Deutschmann Corp Tobe 2900 Columbia Ave Indianapolis 5 Ind
De Wald Radio 35-15 37 Ave Long Island City 1 NY
Dialight Corp 60 Stewart Ave Brooklyn 37 NY
Dinion Coil Co Main St Caledonia NY
Don Bosco Electronics 641 S 2 St Plainfield NJ
Don-Ell Corp 3645 Upton Toledo 13 Ohio
Donner Scientific Co 888 Galindo St Concord Calif
Door Masters Inc 2310 Michigan Ave Santa Monica Calif
Dormeyer Corp 700 N Kingsbury Ave Chicago 10 Ill
Doss Electronic Research 820 Baltimore Kansas City 5 Mo
D&R Ltd 402 E Gutierrez Santa Barbara Calif
Drake Electric 3656 Lincoln Ave Chicago 13 Ill
Drake Mfg Co 1713 W Hubbard St Chicago 22 Ill
Dreier Bros 7301 S Woodlawn Ave Chicago 19 Ill

Dubbings Sales 226 Franklin Ave Hewlett LI NY
DuKane Corp St Charles Ill
Dumont Labs Allen B 750 Bloomfield Ave Clifton NJ
Dunwell Mfg Corp 257 Queen Anne Rd Bogota NJ
Duotone Co Locust St Keyport NJ
Dutch Brand Div Johns-Manville 7800 Woodlawn Ave Chicago 19 Ill
Dutrex Industries 250 4 Ave New York 3 NY
Dynaco Inc 617 N 41 Philadelphia 4 Pa
Dynamic Electronics 87-46 123 St Richmond Hill NY.
Dynavox Corp 40-05 21 St Long Island City 1 NY

Eagle Electronics Corp PO Box 775 Meriden Conn
Eastern Jewel Corp Rego Park 74 NY
Eastman Kodak Co 343 State St Rochester 4 NY
Easy-Up Inc 1006 State St Racine Wis
Eby Sales Co 130 Lafayette St New York 13 NY
EICO (see Electronic Instrument Co)
Eicor Div Scranton Corp 4059 W North Ave Chicago
Eidson Electronics Co 1902 N 3 St Temple Texas
Eitel-McCullough 301 Industrial Way San Carlos Calif
Electralab Inc Needham Hgts 94 Mass
Electrend Products State & Water Sts St Joseph Mich
Electric Soldering Iron Co W Elm St Deep River Conn
Electric Storage Battery 246 E 131 St Cleveland 1 Ohio
Electrocraft Inc 4432 N Kedzie Chicago 25 Ill
Electromatic Industries 3000 Taft St Hollywood Fla
Electron Enterprises 6917 W Stanley Ave Berwyn Ill
Electronic Applications 194 Richmond Hill Stamford Conn
Electronic Chemical Corp 813 Communipaw Ave Jersey City 4 NJ
Electronic Devel Assoc 125 E 46 St New York 17 NY
Electronic Devices 429 12 St Brooklyn 15 NY
Electronic Fabricators 682 Broadway New York 12 NY
Electronic Instrument Co 33-00 Northern Blvd Long Island City 1 NY
Electronic Measurements 625 Broadway New York 12 NY
Electronic Publishing 180 W Wacker Dr Chicago 6 Ill
Electronic Solvents 170 N Park St E Orange NJ
Electronic Technician 480 Lexington Ave New York 17 NY
Electronic Test Instrument Corp Wixom Mich
Electronic Utilities 2244 S Western Ave Chicago Ill
Electron-Radar Prods 4806 W Chicago Ave Chicago 51
Electrons Inc 127 Sussex Ave Newark 3 NJ
Electro-Physics Co 287-U Broadway New York 7 NY
Electro Products Labs 4501 N Ravenswood Chicago 40
Electro-Products Inc 15050 Schaefer Hwy Detroit 27
Electro-Sonic Labs 35-54 36 St Long Island City NY
Electro-Tech Equip 308 Canal St New York 13 NY
Electro-Voice Inc Cecil & Carrol Sts Buchanan Mich
Electrovox Co 60 Franklin St East Orange NJ
Elgin National Watch Co Electronics Div 2435 N Naomi St Burbank Calif
Emerson Radio & Phono 14 & Coles Sts Jersey City 7 NJ
Energy Kontrols 11 S 1 St Geneva Ill
Entron Inc PO Box 287 Bladensburg Md
Equipto Aurora Ill
Ercona Corp 16 W 46 St New York 36 NY
Erie Resistor Corp 644 W 12 St Erie 6 Pa
Erwood Inc 1770 W Berteau Ave Chicago 13 Ill
Essex Wire Corp 1601 Wall St Ft Wayne 6 Ind
E-Z-Hook Test Prods 1536 Woodburn Ave Covington Ky
E-Z Way Towers 5901 E Broadway Tampa 5 Fla

Fairbanks Co 393 Lafayette St New York 3 NY
Fairchild Recording Equipment Corp 10-40 45 Ave Long Island City 1 NY
Fanon Electric Co 98 Berriman St Brooklyn 8 NY
Fast Chemical Prods 20 Gunther Ave Yonkers 4 NY
Federal Anti Capacity Switch 24 Brunck Rd Lancaster NY
Federal Screw Prods 3917 N Kedzie Chicago 18 Ill
Federated TV Mart 513 Rogers Ave Brooklyn 25 NY
Fedtro Inc Federal Electronics Bldg Rockville Centre NY
Feiler Eng'g & Mfg 8026 N Monticello Skokie Ill
Fen-Tone Corp 106 5 Ave New York 11 NY
Ferro Dynamics Corp Gregg St Lodi NJ
Fidelity Amplifier Co 1633 N Halsted St Chicago 14 Ill
Fidelitone Inc 6415 N Ravenswood Ave Chicago 26 Ill
Filtron Co 131-15 Fowler Ave Flushing 55 NY
Finney Co 34 W Interstate St Bedford Ohio
Fisher Berkeley 4224 Holden Emeryville 8 Calif
Fisher Radio Corp 21-21 44 Dr Long Island City 1 NY
Flamemaster Chemicals 3813 Hoke Ave Culver City Calif
Flexo Int'l 3720 N Milwaukee Ave Chicago 41 Ill
Forest Electric Co 7216 Circle St Forest Park Ill
Foto-Video Labs 36 Commerce Rd Cedar Grove NJ
Fourjay Industries 2360 W Dorothy Lane Dayton Ohio
Freed Transformer Co 1718 Weirfield St Brooklyn 27 NY
Fringe Beam Antenna PO Box 376 Huntsville Ala

Garde Mfg Co 53 John Cumberland RI
Garrard Sales (see British Industries)
GC Electronics 400 S Wyman Rockford Ill
Gee-Lar Mfg Co 400 S Wyman St Rockford Ill
General Cement Mfg 400 S Wyman St Rockford Ill
General Crystal Co PO Box 9 Burlington Wis
General Electric Co Apparatus Sales Div 1 River Rd Schenectady 5 NY
General Electric Co Communication Products Dept Lynchburg Va
General Electric Co Miniature Lamp Dept Nela Park Cleveland 12 Ohio
General Electric Co Mobile Div Atlantic Bldg Syracuse NY
General Electric Co Radio Receiver Dept W Genesee St Auburn NY
General Electric Co Receiving Tube Div Owensboro Ky
General Electric Co Semiconductor Products Dept Electronics Park Syracuse NY
General Electric Co TV Receiver Dept Electronics Park Syracuse NY
General Industries Co Olive & Taylor Sts Elyria Ohio
General Instrument Corp 65 Gouverneur St Newark 4 NJ
General Instrument Corp Distr Div Radio Receptor Corp 240 Wythe Ave Brooklyn 11 NY
General Kinetics Inc 555 23 St S Arlington 2 Va
General Radio 22 Baker Ave West Concord Mass
General RF Fittings 702 Beacon Boston 15 Mass
General Transistor 91-27 138 Pl Jam'aica 35 NY
Gernsback Library 154 W 14 St New York 11 NY
Gerrard & Co AJ 1950 Hawthorne Ave Melrose Park Ill
GianTView TV Network 901 Livernois Ave Ferndale 20 Mich
Girard-Hopkins 1000 40 Ave Oakland 1 Calif
Glaser-Steers Corp 20 Main St Belleville 9 NJ
Gonset Div Young Spring & Wire 801 Main Burbank Calif
Good-All Electric Mfg 112 W 1 St Ogallala Nebr
Goodmans (see Rockbar Corp)
Grado Labs 4614 7 Ave Brooklyn 20 NY
Gramer-Halldorson 2734 N Pulaski Chicago 39 Ill
Granco Products 36-07 20 Ave Long Island City 5 NY
Gray Mfg Co 16 Arbor St Hartford 1 Conn
Great Eastern Mfg Co 163 Remsen Ave Brooklyn 12 NY
Greene Co L Charlton 314 Washington Newton Mass
Greenlee Bros 2136 12 St Rockford Ill
Gregg Electric Co 620 Essex St Lawrence Mass
Guardian Electric Mfg 1621 W Walnut St Chicago 12 Ill
Gudeman Co 340 W Huron St Chicago 10 Ill
Guide Lamp Div GMC 2915 Pendleton Ave Anderson Ind
Gulton Industries Inc 212 Durham Ave Metuchen NJ

Hallmark Div Radio Condenser Co Copewood & Davis Sts Camden 3 NJ
Hallmark Electronics 600 W Harvey Philadelphia 44 Pa
Hamer-Drill Co 512 Greenwich St New York 13 NY
Hammarlund Mfg Co 460 W 34 St New York 1 NY
Hardwick Hindle Inc 40 Hermon St Newark NJ
Harman-Kardon Inc 520 Main St Westbury LI NY
Hartley Products Co 521 E 162 St New York 51 NY
Hastings Products 171 Newbury St Boston 14 Mass
Heath Co 305 Territorial Rd Benton Harbor Mich
Hercules Chemical Co 416 Broadway New York 13 NY
Hevi-Duty Electric 2040 W Wisconsin Milwaukee Wisc
Hewlett-Packard 275 Page Mill Rd Palo Alto Calif
Hexacon Electric 161 W Clay Ave Roselle Park NJ
Hickok Electrical Instr 10514 Dupont Cleveland Ohio
High Fidelity Recordings 7803 Sunset Hollywood 46 Calif
Hi-Glo Electronics 8267 S State Rd Goodrich Mich
Hillburn Electronic 55 Nassau Ave Brooklyn 22 NY
Hi-Lo Mfg Corp 1122 W Newport Ave Chicago 13 Ill
Hi-Par Products Co 347 Lunenburg St Fitchburg Mass
Hitemp Wires Inc 1200 Shames Dr Westbury NY
HMH Industries 746 N Pickering Whittier Calif
Hobson Bros 4940 W Lawrence Ave Chicago 30 Ill
Hoffman Electronics 3761 S Hill St Los Angeles 7 Calif
Hoffman Electronics Semiconductor Div Evanston Ill
Holub Industries Inc 413 DeKalb Ave Sycamore Ill
Home Music Systems 646 Madison Ave Memphis Tenn
Hubbell Inc Harvey State & Bostwick Bridgeport 2 Conn
Hudson Lamp Co 528 Elm St Kearny NJ
Hughes Products Int'l Airport Station Los Angeles 45
Hunter Sales Co RN Sante Fe Springs Calif
Hycon Electronics 370 S Fair Oaks Ave Pasadena Calif
Hy-Gain Antenna Prods 1135 North 22 Lincoln Nebr

IDEA Inc 7900 Pendleton Pike Indianapolis 26 Ind
Ideal Industries Inc 5106 Park Ave Sycamore Ill
Illinois Condenser Co 1616 N Throop St Chicago 22 Ill
Illumitronic Eng'g 680 E Taylor Ave Sunnyvale Calif
Induction Motors 570 Main St Westbury NY
Industrial Development Labs 982 River Rd Edgewater NJ
Industrial Hdw Mfg 109 Prince New York 12 NY
Industrial Instruments 89 Commerce Rd Cedar Grove NJ
Industrial Radio Corp 454 N Parkside Ave Chicago 44 Ill
Industrial Test Equip Co 55 E 11 St New York 3 NY
Industro Transistor 35-10 36 Ave Long Island City 6 NY
Injectorall Co 2081 Shore Pkwy Brooklyn 14 NY
Instrument Labs 315 W Walton Pl Chicago 10 Ill
Instrument Resistors Co 1036 Commerce Ave Union NJ
Intelex Systems 22 Thames St New York 6 NY
Int'l Business Machines Kingston NY
Int'l Crystal Mfg 18 N Lee Ave Oklahoma City 2 Okla
Int'l Electronic Corp 81 Spring St New York 12 NY
Int'l Electronics 2649 Brenner Dr Dallas 20 Texas
Int'l Pacific Recording 6906 Santa Monica Hollywood Calif
Int'l Radio & Electronics Corp S 17 St & Mishawaka Rd Elkhart Ind
Int'l Rectifier Corp 1521 E Grand Ave El Segundo Calif
Int'l Register 2620 W Washington Blvd Chicago 12 Ill
Int'l Resistance Co 401 N Broad St Philadelphia 8 Pa
Int'l Wire & Cable 1665 N Milwaukee Chicago Ill
Isolantite Mfg Corp Warren Ave Stirling NJ
ITT Components 100 Kingsland Rd Clifton NJ

Jackson Electrical Instr 18 S Patterson Dayton 2 Ohio
James Vibrapowr Co 4050 N Rockwell Chicago 18 Ill
Jan Hdw Mfg 38-01 Queens Blvd Long Island City 1 NY
Jansa Woodworking 350 Meserole St Brooklyn 6 NY
JanZen (see Neshaminy Electronic Corp)
Javex Electronics PO Box 646 Redlands Calif
Jensen Industries 7333 W Harrison St Forest Park Ill
Jensen Mfg Co 6601 S Laramie Ave Chicago 38 Ill
Jerrold Electronics 15 St & Lehigh Ave Philadelphia Pa
Jersey Specialty Co Burgess Pl Mountainview 10 NJ
JFD Electronics 6101 16 Ave Brooklyn 4 NY
Johnson Co EF Waseca Minn
Jones & Laughlin 3 Gateway Center Pittsburgh 30 Pa

Kaar Eng'g Corp 2995 Middlefield Rd Palo Alto Calif
Kandy Records 203 N Wabash Chicago 1 Ill
Karg Labs 30 Meadow St South Norwalk Conn
Karlson Assoc 433 Hempstead Ave W Hempstead NY
Kay Electric Co Maple Ave Pine Brook NJ
Kemtron Electron Prods 14 Prince Pl Newburyport Mass
Kenwood Eng'g C 265 Colfax Ave Kenilworth NJ
Kepco Inc 131-38 Sanford Ave Flushing 55 NY
Kester Solder Co 4201 Wrightwood Ave Chicago 39 Ill
Keystone Electronics 49 Bleecker St New York 12 NY
K-G Electronics 2738 N Sheffield Ave Chicago 14 Ill
Kingdom Products 514 Broadway New York 12 NY
Kingston Industries North St Medfield Mass
Kin Tel 5725 Kearny Villa Rd San Diego 11 Calif
Kit-Tronics 2315 Hendola Dr NE Albuquerque NM
Kleer-Vue Mfg Co PO Box 10304 Pittsburgh 34 Pa
Klein & Sons Mathias 7200 McCormick Rd Chicago 45 Ill
KLH Research & Devel 30 Cross St Cambridge Mass
Klipsch & Associates Box 96 Hope Ark
Knights Co James Church & Wells St Sandwich Ill
Kraeuter & Co 585 18 Ave Newark 3 NJ
Kriss Electronics 191 Oraton St Newark 4 NJ
Krohn-Hite Corp 580 Mass Ave Cambridge 39 Mass
Krylon Inc Ford & Washington Sts Norristown Pa
KTV Tower & Communication Equip Sullivan Ill
Kuhn Electronics 20 Glenwood Ave Cincinnati 17 Ohio
Kurman Electric Co 191 Newel St Brooklyn 22 NY
Kwikheat Mfg Co 3732 San Fernando Rd Glendale Calif

LaBelle Industries Oconomowac Wis
Lab-Tronics Inc 3656 N Lincoln Ave Chicago 13 Ill
Lampkin Labs Inc Meter Div Bradenton Fla
Langevin Div W L Maxson Corp 47-37 Austell Pl Long Island City 1 NY
Lansing Sound J B 3249 Casitas Los Angeles 39 Calif
LEE Inc 625 New York Ave NW Washington 1 DC
Leitch-Huard Corp Stark & Commercial Manchester NH
Lenk Mfg Co Franklin Ky
LESA of America 11 W 42 St New York 36 NY
L I Electro-Labs 1184 Bdwy Hewlett NY
Linell Eng'g 447 South Blvd Oak Park Ill
Lipps Eng'g EA 1511 Colo Ave Santa Monica Calif
Littelfuse Inc 1865 Miner St Des Plaines Ill
Litton Industries 215 S Fulton Ave Mt Vernon NY
Livingston Audio Products Box 202 Caldwell NJ
Loge Sound J M 2171 W Washington Los Angeles Calif
London Records 539 W 25 St New York NY
Lowell Mfg Co 3030 Laclede Station Rd St Louis 17 Mo
Luper & Sundberg Mfg Co Avon Ill
Luxo Lamp Corp Dock St Port Chester NY

McGraw-Hill Book Co 330 W 42 St New York 36 NY
McIntosh Labs 2 Chambers St Binghamton NY
McKee Door Co 85 Hankes Ave Aurora Ill
Macmillan Co 60 5 Ave New York NY
Madison Fielding Corp 5 Lorimer St Brooklyn 6 NY
Magnadyne Corp 84 S Water St Port Chester NY
Magnasync Mfg 5546 Satsuma Ave N Hollywood Calif
Magnevox Co 2131 Bueter Rd Ft Wayne 4 Ind
Magnecessories Box 6960 Washington 20 DC
Magnecord Div Midwestern Instruments Tulsa Okla
Magnetic Shield Div Perfection Mica Co 1322 N Elston Ave Chicago 22 Ill
Majestic Int'l Sales 743 N LaSalle St Chicago 10 Ill
Major Electronics Inc 762 Wythe Ave Brooklyn 11 NY
Mallory & Co Inc P R 3029 E Washington St Indianapolis Ind
Marantz Co 25-14 Bdwy Long Island City 6 NY
Marathon Battery Co 840 Henrietta St Wausau Wis
Marco Industries Inc PO Box 134 Camp Hill Pa
Marjo Technical Prods 1150 E Henry St Linden NJ
Markell Associates Jeff 764 6 Ave New York 10 NY
Mark-Ko 3015 Monroe St Toledo 6 Ohio
Master Mobile Mounts 1306 Bond Los Angeles 15 Calif
Mastra Co 2104 Superior Ave Cleveland 14 Ohio
Measurements Div McGraw Edison Boonton NJ
Medal Mfg Co 330 Vine St Sharon Pa
Melody Master Mfg 2842 N Cicero Ave Chicago 41 Ill
Mercury Record 35 E Wacker Dr Chicago 1 Ill
Merit Coil & Transformer 2027 Sherman St Hollywood Fla
Merix Chemical Co 2234 E 75 St Chicago 49 Ill
Meters Inc 5353 N Keystone Ave Indianapolis 20 Ind
Metropolitan Supply 1133 Bdwy New York 10 NY
Metzer Eng'g 1041 N Sycamore Ave Hollywood 38 Calif
MGM Records 1540 Broadway New York NY
Mica Fabricating Co 53 Central Ave Rochelle Park NJ
Micamold Electronics 1087 Flushing Ave Brooklyn 37 NY
Michigan Magnetics Inc Vermontville Mich
Mico Instrument 80 Trowbridge St Cambridge Mass
Micro-Circuits Co New Buffalo Mich
Micro Switch Div Minn-Honeywell Regulator Freeport Ill
Microtran Co 145 E Mineola Ave Valley Stream NY
Middlesex Wood Prods Newtown Rd Littleton Mass
Mid-Eastern Electronics 32 Commerce St Springfield NJ
Midland Mfg 3155 Fiberglas Rd Kansas City 15 Kans
Mid-West Coil & Transformer 1642 N Halsted St Chicago 14 Ill
Midwest Naturlite 6651 N Clark St Chicago 26 Ill
Miles Reproducer Co 812 Broadway New York 3 NY
Millen Mfg Co James 150 Exchange St Malden 48 Mass
Miller Co J W 5917 S Main St Los Angeles 3 Calif
Miller Co Sanford 11 Lynch St Brooklyn 11 NY
Miller Electro-Research 5529 S 5 St Milwaukee 7 Wis
Miller Mfg Co M A Libertyville Ill
Millers Falls Co 57 Wells St Greenfield Mass
Millivac Instruments Box 997 Schenectady NY
Milwaukee Resistor 700 W Virginia St Milwaukee 4 Wis
Milwaukee Truck 250 N 12 St Milwaukee Wis
Minn-Honeywell Semiconductor Prods Div 2753 4 Ave S Minneapolis 8 Minn
Minnesota Mining & Mfg Co St Paul 6 Minn
Mitchell Industries P O Box 17 Municipal Airport Mineral Wells Texas
Mobil Electronics 1111 State Rd 67 E Anderson Ind
Modern Wire Co 39-30 Review Ave Long Island City 1 NY
Mohawk Wire & Cable Corp 320 River St Fitchburg Mass
Montgomery Ward 618 W Chicago St Chicago 7 Ill

Monitoradio (see IDEA Inc)
Monument Eng'g 1625 Bellefontaine Indianapolis 2 Ind
Moody Machine Products 42 Dudley St Providence 5 RI
Moran Products 2925 E 55 St Cleveland 27 Ohio
Morrow Radio Mfg Co PO Box 1627 Salem Ore
Mosley Electronics 8622 St Charles Rock Rd St Louis Mo
Moss Electronic Inc 3849 10 Ave New York 34 NY
Motorola Communications & Electronics Inc 4501 W Augusta Blvd Chicago 51 Ill
Motorola Inc 4545 W Augusta Blvd Chicago 51 Ill
Motorola Inc Semiconductor Div 5005 E McDowell Rd Phoenix Ariz
MP Eng'g Co Fairfield 3 Conn
Muckle Mfg Co Owatonna Minn
Mucon Corp 9 St Francis St Newark 5 NJ
Mueller Electric Co 1575 Y E 31 St Cleveland 14 Ohio
Mullard (see Int'l Electronic Corp)
Multicore Sales (see British Industries)
MusiCall Corp 4512 W Jefferson Blvd Los Angeles Calif

Narda Ultrasonics 625 Main St Westbury LI NY
National Carbon Co 30 E 42 St New York 17 NY
National Cash Register Main & K Sts Dayton 9 Ohio
National Co 61 Sherman St Malden 48 Mass
National Radiac 475 Washington St Newark 2 NJ
National Tape Library Box 3646 Washington 7 DC
National TV Tube Inc Route 46 Saddle Brook NJ
Neshaminy Electronic Corp Neshaminy Pa
Neumade Products 250 W 57 St New York 19 NY
Newcastle Fabrics 80 Wythe Ave Brooklyn 11 NY
Newcomb Audio Prods 6824 Lexington Hollywood Calif
New England Electrical Works 365 Main St Lisbon NH
New England Electronic Components 717 Main St Holyoke Mass
Newman Corp M M 79 Clifton Ave Marblehead Mass
Nichols Wire & Aluminum Co 1725 Rockingham Rd Davenport Iowa
Nikoh Tube 5000 S Whipple St Chicago 32 Ill
Non-Linear Systems Del Mar Airport Del Mar Calif
North American Philips Co 230 Duffy Ave Hicksville NY
North Electric Co 355 S Market St Galion Ohio
North Hills Electric 402 Sagamore Ave Mineola NY
North Shore Nameplate 214-27 Northern Blvd Bayside 61 NY
Nortronics Co 1015 S 6 St Minneapolis 4 Minn
Nylok Corp 611 Industrial Ave Paramus NJ

Oak Mfg Co 1260 Clybourn Ave Chicago 10 Ill
O'Brien Electric 12926 Saticoy N Hollywood Calif
Oelrich Publications 4308 Milwaukee Ave Chicago 31 Ill
Ohmite Mfg Co 3601 Howard St Skokie Ill
Olympic Radio & TV 34-01 38 Ave Long Island City 1 NY
Omegatape (see Int'l Pacific Recording Co)
ORRadio Industries Shamrock Circle Opelika Ala
Oryx Co 9015 Wilshire Blvd Beverly Hills Calif
Oxford Components 556 W Monroe St Chicago 6 Ill
Oxford Electric 3911 S Michigan Ave Chicago 15 Ill

Pace Electrical Instr 70-31 84 St Glendale 27 LI NY
Pacific Transducer 11836 W Pico Los Angeles 64 Calif
Packard-Bell 12333 W Olympic Blvd Los Angeles Calif
Paco Electronics 70-31 84 St Glendale 27 LI NY
Panoramic Radio Prods 514 S Fulton Ave Mt Vernon NY
Parker Metal Goods 85 Prescott St Worcester Mass
Partridge Transformers 258 Bdwy New York 7 NY
Paxton Products 929 Olympic Blvd Santa Monica Calif
PCA Electronics 16799 Schoenborn St Sepulveda Calif
Peerless Prods Industries 812 N Pulaski Chicago 51 Ill
Peirce Dictation 5900 N Northwest Hwy Chicago 31 Ill
Pendar Inc PO Box 3355 Van Nuys Calif
Penn-Tran Corp PO Box 149 Bellefonte Pa
Penn TV Products 1835 Ruan Philadelphia Pa
Pennwood Numechron 7249 Frankstown Ave Pittsburgh Pa
Pentron Corp 777 S Tripp Ave Chicago 24 Ill
Permacel US Hwy #1 New Brunswick NJ
Perma-Power Co 3100 N Elston Ave Chicago 18 Ill
Permo Inc 6415 Ravenswood Ave Chicago 26 Ill
Permoflux Prods 4101 San Fernando Rd Glendale Calif
Peschel Electronics Inc RFD #1 Patterson NY
Pfanstiehl Chemical 104 Lake View Ave Waukegan Ill
Phalo Plastics 530 Boston Turnpike Shrewsbury Mass
Phaostron Instrument & Electronic Co S Pasadena Calif
Philco Corp C & Tioga Sts Philadelphia 34 Pa
Philco Corp Accessory Div C & Westmoreland Sts Philadelphia 34 Pa
Philco Corp Lansdale Tube Co Div Lansdale Pa
Philmore Mfg 130-01 Jamaica Ave Richmond Hill 18 NY
Philosophical Library 15 E 40 St New York 16 NY
Philson Mfg Co 47 Bergen St Brooklyn 1 NY
Photo Crystals Inc 15 S 1 St Geneva Ill
Pickens & Co N 31 E 14 St New York NY
Pickering Co Sunnyside Blvd Plainview LI NY
Pilot Radio Corp 37-06 36 St Long Island City 1 NY
Pioneer Electronics 2235 S Carmelina Los Angeles 64
Pipestone Sales Co PO Box 311 Pipestone Minn
Pitman Publ Co 2 W 45 St New York 36 NY
Planet Sales 225 Belleville Ave Bloomfield NJ
Plastic Capacitors 2620 N Clybourn Ave Chicago 14 Ill
Plastoid Corp 42-61 24 St Long Island City 1 NY
Polymer Corp 2140 Fairmont Ave Reading Pa
Polyrad Corp 521 Broadway Cincinnati 2 Ohio
Pomona Electronics Co 1126 W 5 Ave Pomona Calif
Portable Elec Tools 320 W 83 St Chicago 20 Ill
Potter & Bromfield Inc Princeton Ind
Powers Co J J 1317 S 5 Ave Maywood Ill
Precise Development Corp 2 Neil Court Oceanside NY
Precision Apparatus Co 70-31 84 St Glendale 27 LI NY
Precision Electronics 9101 King Ave Franklin Park Ill
Premax Products Div Chisholm-Ryder Co Niagara Falls NY
Premier Metal Prods 337 Manida St New York 59 NY
Prentice-Hall Inc 70 5 Ave New York NY
Presto (see Bogen-Presto)
Price & Rutzebeck PO Box 30 Hayward Calif
Pro-Tex Reel Band 2108 Payne Ave Cleveland 14 Ohio
Proto Tool 2209 Santa Fe Ave Los Angeles 54 Calif
Pyramid Electric Co 507 26 St Union City NJ

Quality Electronics 319 Church St New York 13 NY
Quam-Nichols Co 234 E Marquette Rd Chicago 37 Ill
Quick Mount Mfg Co 475 Sterling Pl Brooklyn 38 NY
Quietrole Co 395 St John St Spartanburg SC
Quik-Chek Corp 5212 Pulaski Ave Philadelphia 44 Pa
Qutronic Transformer 525 Bdwy New York 12 NY

Racon Electric Co 1261 Broadway New York 1 NY
Radiart Corp 2900 Columbia Indianapolis Ind
Radio City Products Co Centre & Glendale Sts Easton Pa
Radio Condenser Co Davis & Copewood St Camden 3 NJ
Radio Corp of America Front & Cooper Sts Camden NJ
Radio Corp of America Electron Tube Div 415 S 5 St Harrison NJ
Radio Corp of America Records Div 155 E 24 St New York NY
Radio Merchandise Sales 2016 Bronxdale New York NY
Radio Music Corp 84 S Water St Port Chester NY
Radion Corp 345 Terra Cotta Ave Crystal Lake Ill
Radio Receptor Co 240 Wythe Ave Brooklyn 11 NY
Radio Wire Television Inc Lafayette Radio 165-08 Liberty Ave Jamaica 33 NY
Radix Wire Co 26260 Lakeland Blvd Cleveland 32 Ohio
Ram Electronics Sales 600 Industrial Ave Paramus NJ
Rapid Electric Co 2881 Middleton Rd Bronx 61 NY
Rauland-Borg Corp 3535 W Addison Ave Chicago 18 Ill
Rauland Corp 4245 N Knox Ave Chicago 14 Ill
Rayline Inc 307 Willis Ave Mineola LI NY
Ray-O-Vac Co 212 E Washington Ave Madison 10 Wis
Raypar Inc 7800 W Addison St Chicago 34 Ill
Raytheon Mfg Co 55 Chapel St Newton 58 Mass
Raytheon Mfg Co Foundry Ave Waltham 54 Mass
RBM Div Essex Wire 131 Godfrey St Loganport Ind
Recoton Corp 52-35 Barnett Ave Long Island City 4 NY
Reeves Soundcraft Great Pasture Rd Danbury Conn
Regency (see IDEA Inc)
Rego Insulated Wire Co 830 Monroe St Hoboken NJ
Reigner Recording Library Union Theological Seminary Richmond Va
Reiter Co F 3340 Bonnie Hill Dr Hollywood 28 Calif
Rek-O-Kut 38-19 108 St Corona 68 NY
Relay Sales Inc PO Box 186 West Chicago Ill
Remington-Rand Inc 315 4 Ave New York NY
Reon Resistor Corp 117 Stanley Ave Yonkers NY
Resistors Inc 5226 W 26 St Cicero 50 Ill
Revere Camera Co 320 E 21 St Chicago 16 Ill
Rhombic Assoc 60 W 45 St New York 36 NY
Richards-Wilcox Mfg Co Aurora Ill
Rider Publisher Inc John F 116 W 14 St New York NY
Riemer Co David 601 W 26 St New York 1 NY
Rimak Inc 10929 Vanowen St No Hollywood Calif
Rinchart Books Inc 232 Madison Ave New York 16 NY
R-K Mfg Co PO Box 98 Carterville Ill
Roberts Electronics 1028 N La Brea Hollywood 38 Calif
Robertson & Ruth Inc 460 W Lake St Elmhurst Ill
Robins Industries 36-27 Prince St Flushing 54 NY
Roche Co Paul C 11 Park Pl New York 7 NY
Rockbar Corp 650 Halstead Ave Mamaroneck NY
Rogers Electronic Corp 43 Bleecker St New York 12 NY
Rogers Mfg Co 214 S Main St Lindsey Ohio
Rohn Mfg Co 116 Limestone Bellevue Peoria 5 Ill
Ronette Sales Corp 190 Earle Ave Lynbrook NY
Royal Electric Corp 95 Grand Ave Pawtucket RI
Rye Sound Corp 145 Elm St Mamaroneck NY

S & A Electronics 1025 Nevada St Toledo 5 Ohio
Safety Nail Driver Corp 70 Rosalie Ave Clifton NJ
Sams & Co Howard W 2201 E 46 St Indianapolis 5 Ind
Sangamo Electric Co Springfield Ill
Saratoga Industries Ballston Ave Saratoga Springs NY
Sargent-Rayment Co 4926 E 12 St Oakland 1 Calif
Sarkes Tarzian (see Tarzian, Sarkes)
Saxton Products 4320 Park Ave New York 57 NY
Scala Radio Co 2814 19 St San Francisco 10 Calif
Schauer Mfg Corp 4500 Alpine Ave Cincinnati 42 Ohio
Scott Inc H H 111 Powder Mill Rd Maynard Mass
Scott Instrument Labs 17 E 48 St New York 17 NY
Scranton Aluminum 419 S Wyoming Ave Scranton Pa
Seco Mfg Co 5015 Penn Ave S Minneapolis 10 Minn
Semi-Elements Inc Saxonburg Pa
Sencore (see Service Instruments)
Service Instruments Corp 121 Official Rd Addison Ill
Service Parts Sys 13380 E 9 Mile Rd East Detroit Mich
Setchell-Carlson Inc New Brighton St Paul 12 Minn
Shallcross Mfg Preston St Selma NC
Shell Electronic Mfg 1688 Utica Ave Brooklyn 34 NY
Sherwood Electronic Labs 4300 N Calif Ave Chicago 18
Shure Brothers Inc 222 Hartrey Ave Evanston Ill
Shurite Meters 130 Wallace St New Haven 8 Conn
Sidco 1729 W Washington Blvd Venice Calif
Sightmaster Corp 50 Aleppo St Providence 9 RI
Simpson Electric Co 5200 W Kinzie St Chicago 44 Ill
Simpson Mfg Mark 32-28 49 St Long Island City 3 NY
Sittler Corp 18 N Ada St Chicago 7 Ill
Skottie Electronics 204 Bridge St Peckville Pa
Skysweeper Inc PO Box 92 McHenry Ill
Smith Inc Herman H 2326 Nostrand Ave Brooklyn 10 NY
Smolin Labs Woodbrook Dr Springdale Conn
Snyder Mfg Co 22 & Ontario Sts Philadelphia Pa
Sola Electric Co 4635 W 16 St Chicago 50 Ill
Sonex Inc 73 S State Rd Upper Darby Pa
Sonic Industries 19 Wilbur St Lynbrook NY
Sonograf Electric 37 E 28 St New York 18 NY
Sonotone Corp Elmsford NY
Sorensen & Co Richards Ave S Norwalk Conn
Soundolier Inc PO Box 3848 St Louis 22 Mo
South River Metal Prods 377 Turnpike South River NJ
Spaulding Products Co 550 W Barner St Frankfort Ind
Specialty Eng'g & Electronics 79 Clifton Pl Brooklyn NY
Spectra-Strip Wire & Cable 10052 Larson Garden Grove Calif
Spencer-Kennedy 1320 Soldiers Field Rd Boston 35 Mass
Spirling Products Henrietta St Hicksville NY
Sprague Products Co Marshall St North Adams Mass
Stackpole Carbon Co Stackpole St St Marys Pa
Stancil-Hoffman 921 N Highland Ave Hollywood 38 Calif
Standard Coil Prods 2085 N Hawthorne Ave Melrose Park Ill
Standard Electrical Products 2240 E 3 St Dayton 3 Ohio
Standard Pressed Steel Co Box 394 Jenkintown Pa
States Co 19 New Park Ave Hartford 6 Conn
Steelman Phono & Radio 716 S Columbus Ave Mt Vernon NY
Stephens Tru-Sonic Inc 8538 Warner Dr Culver City Calif
Stere-O-Craft 1650 Broadway New York 19 NY
Stereo-Ette Co 4908 N Lincoln Ave Chicago 25 Ill
Sterling Hi-Fi Inc 19 W 44 St New York 36 NY
Sterling Transformer 297 N 7 St Brooklyn 11 NY
Stone City Products 1206 7 St Bedford Ind
Stretch Wire Corp PO Box 893 New Rochelle NY
Stromberg-Carlson Special Products Div 1400 N Goodman St Rochester 3 NY
Sunair Electronics Broward Int'l Airport Ft Lauderdale Fla
Superex Electronics Corp 4 Radford Pl Yonkers NY
Superior Electric Co 83 Laurel St Bristol Conn
Superior Instruments 2435 White Plains Rd New York 67 NY
Superscope Inc 8520 Tujunga Ave Sun Valley Calif
Supreme Publications 1760 Balsam Rd Highland Park Ill
Switchcraft Inc 5555 N Elston Ave Chicago 30 Ill
Sylvania Electric Products Inc 1740 Broadway New York 19 NY
Symphonic Radio & Electronics 10 Columbus Circle New York 19 NY

TA Mfg 4607 Alger St Los Angeles 39 Calif
Talk-A-Phone Co 1512 S Pulaski Rd Chicago 23 Ill
Talkmaster Inc 534 Laurel St San Carlos Calif
Tandberg of America 10 E 52 St New York 22 NY
Tannoy (America) Ltd PO Box 177 E Norwich LI NY
Tapedcode Box 31-T Langhorne Pa
Tarzian Inc Sarkes 415 N College Ave Bloomington Ind
Tayloreel Corp 185 Murray St Rochester 6 NY
Tech-Master Corp 75 Front St Brooklyn 1 NY
Technical Appliance Corp 1 Taco St Sherburne NY
Technicraft Co 1156 Commonwealth Ave Boston 34 Mass
Techniques Inc 52 Jackson Ave Hackensack NJ
Tech-Ohm Resistor 36-11 33 St Long Island City 6 NY
Tektronix Inc PO Box 831 Portland 7 Ore
Telco Electronics Div General Cement Rockford Ill
Telechrome Mfg Corp 28 Ranick Dr Amityville NY
Telectro Industries 35-16 37 St Long Island City 1 NY
Telematic Industries 251 Lee Ave Brooklyn 6 NY
Teletest Instrument 120-20 Roosevelt Ave Flushing 68 NY
Teletone Co 1668 Webster Ave New York 57 NY
Televex Co 46 Lakeview Ave Yonkers NY
Tele-Vue Towers 701 49 St S St Petersburg 7 Fla
Telex Inc 1633 Eustis Ave St Paul 1 Minn
Tel-Instrument Electronics 728 Garden St Carlstadt NJ
Telkor Inc Elyria Ohio
Telonic Industries Inc 75 N 2 Ave Beech Grove Ind
Telrex Labs Asbury Park NJ
Tenatronics Ltd 1011 Power Ave Cleveland 14 Ohio
Tenna Lab 417 S 10 St Quincy Ill
Tenna Mfg Co 7580 Garfield Blvd Cleveland 25 Ohio
Tensitron Inc PO Box 185 Harvard Mass
Terado Co 1068 Raymond Ave St Paul 8 Minn
Tetrad Co 62 St Mary St Yonkers NY
TeVco Insulated Wire 108 E Prospect Ave Burbank Calif
Texas Crystals Div Westronix Corp 8538 W Grand Ave River Grove Ill
Texas Instruments PO Box 312 Dallas Texas
Thomas Electronics Inc 118 9 St Passaic NJ
Thordarson-Meissner Belmont & 7 St Mt Carmel Ill
Thorens Co Thorens & Atlantic Ave New Hyde Park NY
Tipco Mfg Co 14734 Calvert Van Nuys Calif
Tobe Deutschmann (see Deutschmann Corp Tobe)
Toman & Co E 8700 W 47 St Lyons Ill
Trans Electronics 7349 Canoga Ave Canoga Park Calif
Transitron Electronic Corp 168 Albion St Wakefield Mass
Trav-Ler Radio 571 W Jackson Blvd Chicago 6 Ill
Triad Transformer Corp 4055 Redwood Ave Venice Calif
Tricraft Products Corp 1122 W Newport Ave Chicago 13
Trimm Inc 400 W Lake St Libertyville Ill
Trio Mfg Co 101 S Union St Griggsville Ill
Triplett Electrical Instrument Co Bluffton Ohio
Tru-Ohm Products 2800 N Milwaukee Chicago 18 Ill
Trutone Electronics 6912 Santa Monica Blvd Hollywood 38 Calif
Tung-Sol Electric Inc 95 8 Ave Newark 4 NJ
Turner Brass Works 821 Park Ave Sycamore Ill
Turner Co 909 17 St NE Cedar Rapids Iowa
TV Hdw Mfg Div General Cement 919 Taylor Ave Rockford Ill

Ultra-Hi TV Mfg 69 Hammond St Worcester Mass
Ultravision Mfg 185 Goffle Rd Hawthorne NJ
Ungar Electric Tools 4101 Redwood Ave Los Angeles
United Audio Prods 202 E 19 St New York 3 NY
United Catalog Publishers 60 Madison Ave Hempstead NY
United Electric Controls 85 School Watertown 72 Mass
United Electronic Mfg Corp 542 39 St Union City NJ
United Motors Service Div GMC General Motors Bldg Detroit Mich
United Sensor & Control Glastonbury Conn
United Speaker Systems 80 Holmes St Belleville NJ
United Transformer 150 Varick St New York 13 NY
United Wire & Supply 1497 Elmwood Ave Providence 7 RI
Universal Circuit Controls 3610 Oakton St Skokie Ill

Universal Products 4100 Taylor Ave Racine Wis
Universal Transistor Prods 17 Brooklyn Ave Westbury NY
University Loudspeakers 80 S Kensico White Plains NY
U S Recording 1121 Vermont Ave NW Washington DC
Utah Radio & Electronic 1124 E Franklin St Huntington Ind
U-Test-M Mfg 4325 W Lincoln Milwaukee Wis
Utica Drop Forge & Tool 2415 Whitesboro St Utica 2 NY

Vaco Products Co 317 E Ontario St Chicago 11 Ill
Valor Electronics 13214 Grenshaw Blvd Gardena Calif
Valpey Crystal Corp 1244 Highland St Holliston Mass
Vanguard Record 154 W 14 St New York 11 NY
Van Norman Industries Inc Electronics Div 186 Granite St Manchester NH
Van Nostrand Co D 120 Alexander St Princeton NJ
Vector Electronic Co 1100 Flower St Glendale 1 Calif
Vemaline Products Co Box 222 Hawthorne NJ
Vemco Mfg 8101 University Des Moines 10 Iowa
Victor Electric Wire & Cable 618 Main St West Warwick RI
Vidaire Electronics Mfg 44 Church St Baldwin LI NY
Video Accessory Mfg 205 S Houston Tulsa 1 Okla
Viking of Minn 9600 Aldrich Ave S Minneapolis Minn
Vis-U-All Prods Co 303 Fuller Ave NE Grand Rapids Mich
Vitramon Inc P O Box 544 Bridgeport Conn
V-M Corp 280 Park St Benton Harbor Mich
Vocaline Co of America Inc Old Saybrook Conn
Vokar Products Inc 201 Catherine St Ann Arbor Mich
Vulcan TV Mast & Tower Co 1224 National St Tarrant Birmingham 7 Ala

Waber Electronics 105 Heatherwood Rd Havertown Pa
Walco (see Electrovox Co)
Waldom Electronics 4625 W 53 St Chicago 32 Ill
Wall Mfg Co P Erie St Grove City Pa
Walsco Electronic 3225 Exposition Pl Los Angeles Calif
Ward Leonard Electric Co Electronic Distributor Div 3100 N Cicero Ave Chicago 41 Ill
Ward Products Corp Div Gabriel Co 1148 Euclid Ave Cleveland 15 Ohio
Wassco Electric Prods 2032 2 Ave S St Petersburg 12 Fla
Waterman Products 2445 Emerald St Philadelphia Pa
Waters Conley 17 E Chestnut St Chicago 11 Ill
Waters Mfg Inc Boston Post Rd Wayland Mass
Weathers Industries 66 E Gloucester Pike Barrington NJ
Webcor Inc 5610 W. Bloomingdale Ave Chicago Ill
Webster Electric Co 1900 Clark St Racine Wis
Wellcor Inc 1218 N Wells St Chicago 10 Ill
Weller Electric Corp 601 Stone Crossing Rd Easton Pa
Wells Electronics 1701 S Main St South Bend Ind
Wells-Gardner & Co 2701 N Kildare Ave Chicago 39 Ill
Wendell Plastic Fabric Corp 1220 Bdwy New York 11 NY
Wen Products Inc 5806 Northwest Hwy Chicago 31 Ill
Werner Co R D 295 5 Ave New York 16 NY
Westbury Electronics 300 Shames Dr Westbury NY
Western Coil & Electrical Co 215 State St Racine Wis
Westinghouse Electric Corp Electronic Tube Div PO Box 284 Elmira NY
Westinghouse Electric Corp TV-Radio Div Metuchen NJ
Westminster Recording Co 275 7 Ave New York 1 NY
Weston Instruments 614 Frelinghysen Ave Newark 12 NJ
Wharfedale (see British Industries)
Wheeler Electronic 150 E Aurora St Waterbury 20 Conn
White Co O C 17 Hermon St Worcester 8 Mass
Whitley Electronics 43 S Main St Andrews Ind
Wilco Corp 546 Drover St Indianapolis 21 Ind
Wilcox-Gay Corp Charlotte Mich
Wiley & Sons John 440 4 Ave New York 16 NY
Wind Turbine Co West Chester Pa
Winegard Co 3000 Scotten Blvd Burlington Iowa
Winston Electronics 4312 Main St Philadelphia 27 Pa
Word Records Inc 3407 Franklin Ave Waco Texas
Workman TV Inc 309 Queen Anne Rd Teaneck NJ
Worner Electronic Devices Rankin 1 Ill
Wright Steel & Wire G F 243 Stafford Worcester 3 Mass
Wright Zimmerman New Brighton St Paul 12 Minn
Wuerth Tube-Saver Corp 9125 Livernois Ave Detroit Mich

Xcelite Inc Orchard Park NY

Yardney Electric Corp 40 Leonard St New York 13 NY
Yeats Appliance Dolly 2124 N 12 St Milwaukee 5 Wis

Zalytron Tube Corp 220 W 42 St New York 36 NY
Zenith Radio Corp 6001 Dickens Ave Chicago 39 Ill
Zierick Mfg Corp Beechwood & Rockdale New Rochelle NY
Zodiac Recording Co 501 Madison Ave New York 22 NY
Z & W Mfg 30240 Lakeland Wickliffe Ohio

Technician Associations—1959 Roster

with name of secretary unless otherwise noted

ALABAMA

GADSDEN—Radio & TV Technician's Guild of Ala 404 N 16 St—Guy Brooks

ARIZONA

PHOENIX—Better Electronic Service Technicians of Ariz PO Box 1284—Dick Ramos

ARKANSAS

FT SMITH—RTTA-TESA Ft Smith PO Box 133—Johnny Mathis
N LITTLE ROCK—TV Service Assn of Ark (TVSA) PO Box 542—T R McCoy
TEXARKANA—Tri-State TV Assn 1824 State Line Ave—Dick Hoggard

CALIFORNIA

ARLINGTON—Citrus Belt Chapter Radio TV Technician Assn of Calif Box 74—Wade Nelson
BAKERSFIELD—Kern County TV & Electronics Assn 417 E 19 St—H E Watkins
BURLINGAME—TV Service Dealers Assn (TSDA) 1450 Broadway—F McCarthy
EL MONTE—RTA San Gabriel Valley Chapter Box 187—Dan Tamayo
GLENDALE—Society of Radio-TV Technicians PO Box 4012 North Glendale Station—Webb Benedict
LONG BEACH—Radio-TV Technicians Assn PO Box 4085—James C Hughes
LOS ANGLES—Appliance Profession Assn 588 N Larchmont Blvd—Gerson D Ribnick
LOS ANGELES—Electric League of Los Angeles 2508 W Olympic Blvd—W Floyd Lovelace
LOS ANGELES—Independent TV Service Dealers of Los Angeles County 213 S Coronado St—Abe Bowers
LOS ANGELES—RTA South Bay Chapter 6810½ La Tijera Blvd—Al Cardamenis
OAKLAND—Alameda County TV & Radio Assn 6609 Chabot Rd—Fred W Rock
PASADENA—Pasadena RTA Box 1143—Virgil Gaither
SAN JOSE—Radio-T/V Assn of Santa Clara Valley Room 467A Porter Bldg—John Murphy
SOUTH GATE—Radio-TV Technicians Assn San Antonio Chapter PO Box 626—James Spalding
VAN NUYS—Society of Radio & TV Technicians Po Box 126—Francis Pratt

CONNECTICUT

SPRINGDALE—TV Service Guild Woodbrook Drive—B Smolin
WATERBURY—TELSA of Conn 9 Woodtick Rd—Deane Gould

DISTRICT OF COLUMBIA

WASHINGTON—TV Service Assn of Metropolitan Washington 852 Washington Bldg 15 & NY Ave NW—Hyman Nussbaum Exec Secy

FLORIDA

HOLLYWOOD—South Broward Radio-TV Technician Guild 711 S 21 Ave—Robert H Austin
MIAMI—Radio-TV Technicians Guild of Fla 119 NW 12 Ave—Sam Kessler
TAMPA—Radio & TV Service Assn 5801 Florida Ave—W E Duval

GEORGIA

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MOUNTAIN GROVE—TESA of South Central Mo—William Pryer

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ST LOUIS—TESA—St Louis 5757 Chippewa—Wilma Tompkins

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VANDUSER—TESA of SEMO Box 116—Lionel Verble

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TOMS RIVER—TV Service Assn of Ocean County Church Rd—Jacob Pyenson

TRENTON—Radio Servicemen's Assn 343 William St Michael E Toth

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ALBANY—TV Service Assn 250 2 Ave—Louis A Ristau Pres

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BROOKLYN—Auto Radio Electronics Assn 1257 Bedford Ave—Edward Eisen Pres

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BUFFALO—Western N Y Electronics Guild 2326 Main St Elmer Bement

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BORGER—TV Electronic Service Assn of Borger 1027 S Main—R F Dietz

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UTAH

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SEATTLE—Northwest Appliance & TV Assn 512 1 Ave N—Robert L Thompson

YAKIMA—Radio TV Service Assn 1010 W Lennox—Neil Cuillier

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Huntington-Electronic Technician Assn P O Box 2022—W G Hite

WISCONSIN

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MILWAUKEE—TESA of Milwaukee 5000 W Burleigh St—Larry Dorst

WYOMING

CHEYENNE—Western Electronics Assn 609 E 16 St—Alvin Pope

CANADA

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WINNIPEG MANITOBA—Radio Electronic Technicians Assn Box 391—Christian Harder

HAMILTON ONTARIO—Radio Electronic Technicians Assn of Ontario 40 Westminster Ave—Gerry F Leeks

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with name of secretary unless otherwise noted

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American Institute of Electrical Engineers 33 W 39 St New York 18 N Y—N S Hibshman

American Institute of Physics 335 E 45 St New York 17 N Y—Wallace Waterfall

American Physical Society Pupin Physics Labs Columbia University New York 27 N Y—Dr Karl K Darrow

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Radio Technical Commission for Marine Services c/o Federal Communications Commission Washington 25 D C—R T Brown

Record Industry Assn of America 1 E 57 St New York 22 N Y—John W Griffin

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LOS ANGELES—Western Electronics Institute 5119 Sunset Blvd-1-2-3-5-6-R

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HARTFORD—Ward School of Electronics 44 Niles St-1-2-3-4-5-6-7-R
STAMFORD—Lincoln Institute 170 Atlantic Square-1-2-6-C

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For more information, write in ELECTRONIC TECHNICIAN'S new product code number on coupon on page 58.

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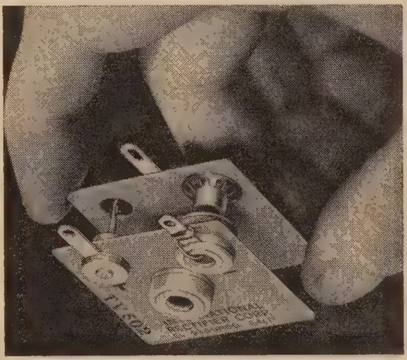
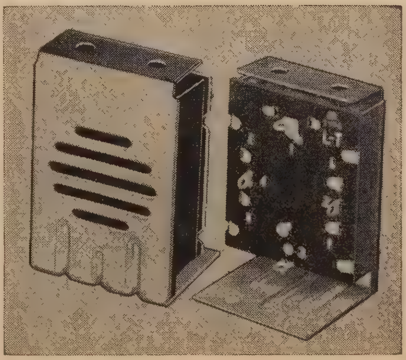


G-C "SAVE-A-TUBE" →

The "G-C CTS Save-A-Tube" eliminates the surge damage to cold tube filaments by allowing tubes to warm up slowly before B + is applied. A built-in thermistor cuts line surges, while a thermo-delay switch delays B +. Unit wired into set, making it a natural service trade modification. Model 5889 for b & w sets using 120-169 watts, and 5890 for 170-275 watts, are $4.95. No. 5891 for color TV sets is $6.95. G-C Electronics Mfg. Co., 400 S. Wyman St. Rockford, Ill. (ELECTRONIC TECHNICIAN 5-11)



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NP "SOUND-OFF"

"Sound-Off" remote control adapts to fit any TV or radio set. It comes complete with clips and 25 ft. of cord. The 3-position remote switch allows you to tune full volume, half-volume or no-volume at a touch. Twin receptacles in bottom of case provide for single or double earphones. Deluxe package RCL-1 retail price is $12.75. Without the ear set, for the buyer who wants the convenience of remote volume control, price is $7.95. New Products Engineering & Mfg. Co., 5305 Chicago Ave., Minneapolis 17, Minn. (ELECTRONIC TECHNICIAN 5-16)

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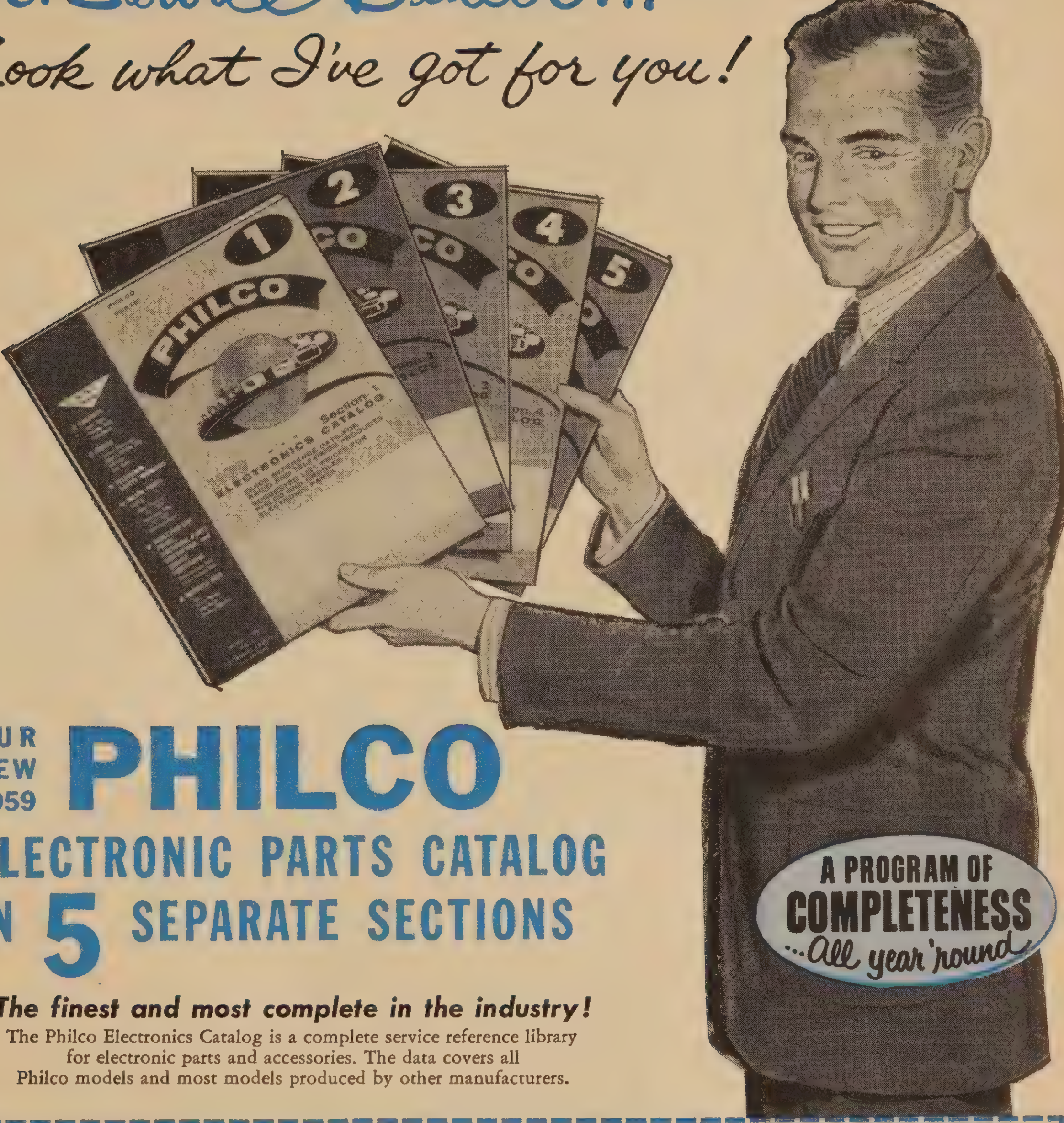

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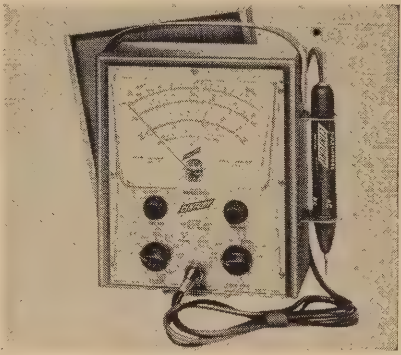
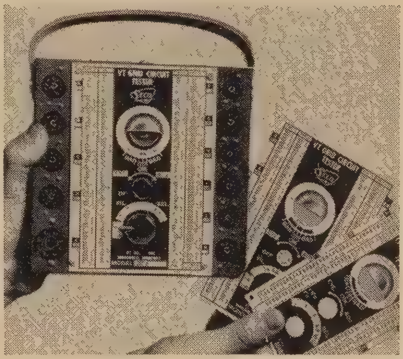
Century VTVM →

Vacuum tube volt meter Model VT-1 features one all-purpose Multi-Probe that will do the work of 4 probes—dc, ac, lo-cap and r-f. The VT-1 is powered with batteries is immune to power line fluctuations. A 6" 100 μa meter is used. Accuracy is 2% of full scale on dc, 5% on ac. VT-1 will measure dc down to 1.5 full scale, and up to 1500 v. It will measure ohms to 1 kmeg and peak-to-peak as low as 3 v. AC ranges to 1500 v. Century Electronics Co., Inc., 111 Roosevelt Ave., Mineola, N.Y. (ELECTRONIC TECHNICIAN 5-1)



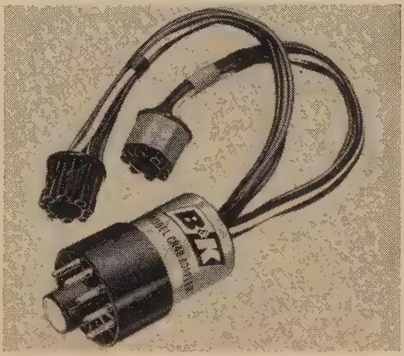
Seco TESTER PANELS →

New 1959 panels for the Grid Circuit Tube Testers have just been issued, making it possible for GCT-8 and GCT-5 owners to increase tube coverage by replacing front. The panel for the GCT-8 (Part No. 598) lists receiving as well as industrial types. The GCT-5 panel (Part No. 595) lists latest releases plus additional tubes never listed before. $1.00 each. Seco Mfg. Co., 5015 Penn Ave., So., Minneapolis, Minn. (ELECTRONIC TECHNICIAN 5-2)



B&K Model CR ADAPTER →

A handy new CRT Adapter Model CR-48, at $4.95 net is for testing and rejuvenating 110° picture tubes with 2.34, 2.68 and 8.4 v. filaments. It is designed for use with all B&K Models 400 and 350 Cathode Rejuvenator Testers. Simply plug in and use. This new CR48 Adapter does not replace the Model C40 CRT Adapter which is used for standard 6.3 v. filament 110° tubes and also for color tubes. B&K Mfg. Co., 3726 N. Southport Ave., Chicago 13, Ill. (ELECTRONIC TECHNICIAN 5-3)



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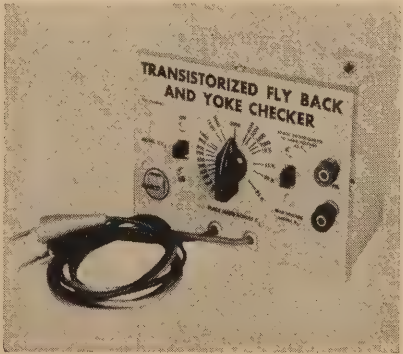
Flyback and yoke checker permits the TV technician to spot a defective high voltage network. It checks the impedance of the primary winding at the original frequency at which it is used. In this way a positive check with a measured impedance can be made to locate trouble in the damper circuit horizontal oscillator, flyback or yoke. Fully transistorized. $17.95. Includes booklet, "Trouble Shooting High Voltage Networks." Manco Mfg. Co., 380 Union St., Manchester, N.H. (ELECTRONIC TECHNICIAN 5-4)



Jerrold SWEEP GENERATOR

An advanced model (900-A) incorporates a series of engineering refinements. It supplies a sweep signal in two ranges —VHF and UHF with center at any frequency from 500 kc to 1,000 mc and with sweep widths as broad as 400 mc and as narrow as 100 kc. The r-f output—carefully monitored by matched, crystal diodes feeding a two stage, push-pull amplifier—is flat within ±0.5 db up to 800 mc. Jerrold Electronics Corp., 15th & Lehigh Ave., Philadelphia 32, Pa. (ELECTRONIC TECHNICIAN 5-5)

Motorola VOLTMETER

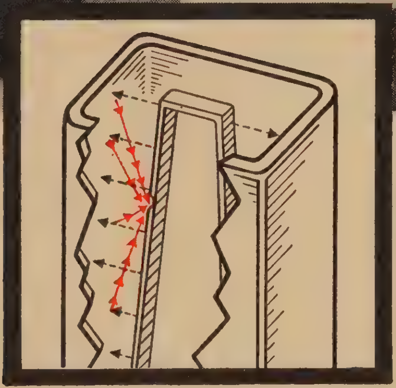
Transistorized battery operated ac voltmeter, selling at $165, has full scale readings of 1 mv. to 300 v. in 12 ranges with an essentially flat frequency response of 20 cycles to 1.5 mc. It has a db scale and a "battery OK" scale. It is especially useful when working on two-way radio, audio and data systems, broadcast and industrial equipment. High input impedance of 10 megohms shunted by 15 μμf is provided in the 1-300 v. range. Accuracy is 5% to 1 mc and is useable up to 5 mc. Contains 7 transistors. Batteries provide 400 hours of operation. Motorola Communications & Electronics, Inc., 4501 W. Augusta Blvd., Chicago 51, Ill. (ELECTRONIC TECHNICIAN 5-7)

EMC V-O-C METER

Model 107A vacuum tube volt-ohm-capacity meter features a 6" meter. It measures peak-to-peak voltages in six ranges from 0.2 to 2800 v. For ac rms voltages it is capable of measuring in six ranges from 0.1 v. to 1000 v. Capacity can be measured in six ranges from 50 μμf to 5000 μf. Resistance from 0.2 ohms to 1000 megohms. The unit also is capable of measuring inductance from 1.4 to 140,000 henries in four ranges. $51.40. Also available in Kit Form at $36.50. Electronic Measurements Corp., 625 Broadway, New York 12, New York. (ELECTRONIC TECHNICIAN 5-6)

Waldom PANEL METER

Line of panel meters are manufactured in both clear plastic and black bakelite, and are available in almost every type, range and resistance. Accuracy is 2% of full scale. Special types and ranges are available on special order. Waldom Electronics, Inc., 4625 53rd St., Chicago 32, Ill. (ELECTRONIC TECHNICIAN 5-8)



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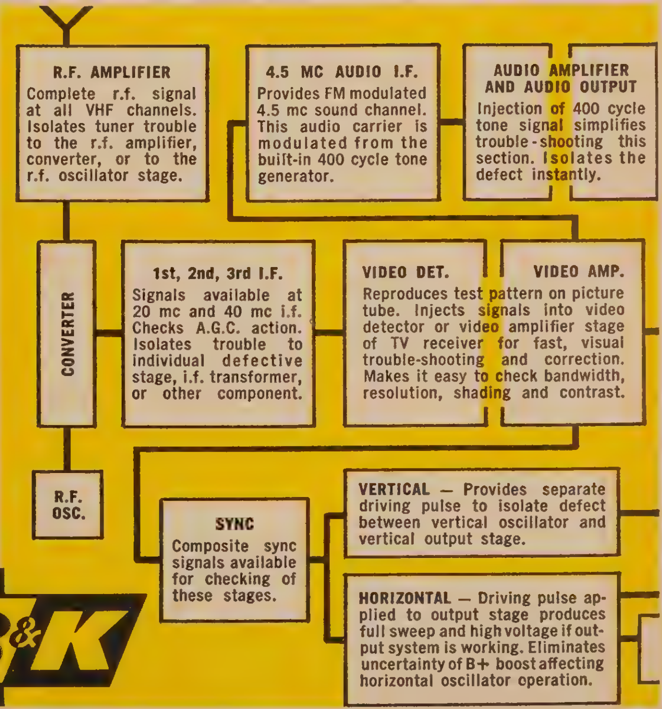

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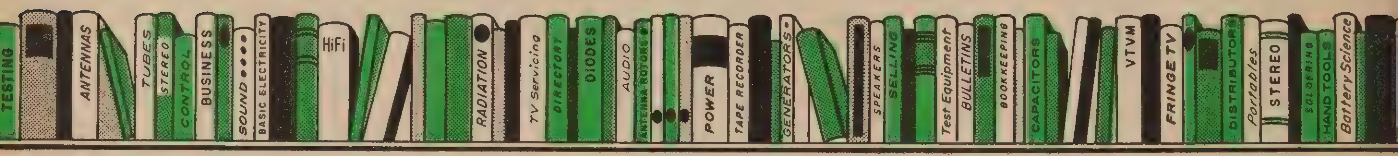

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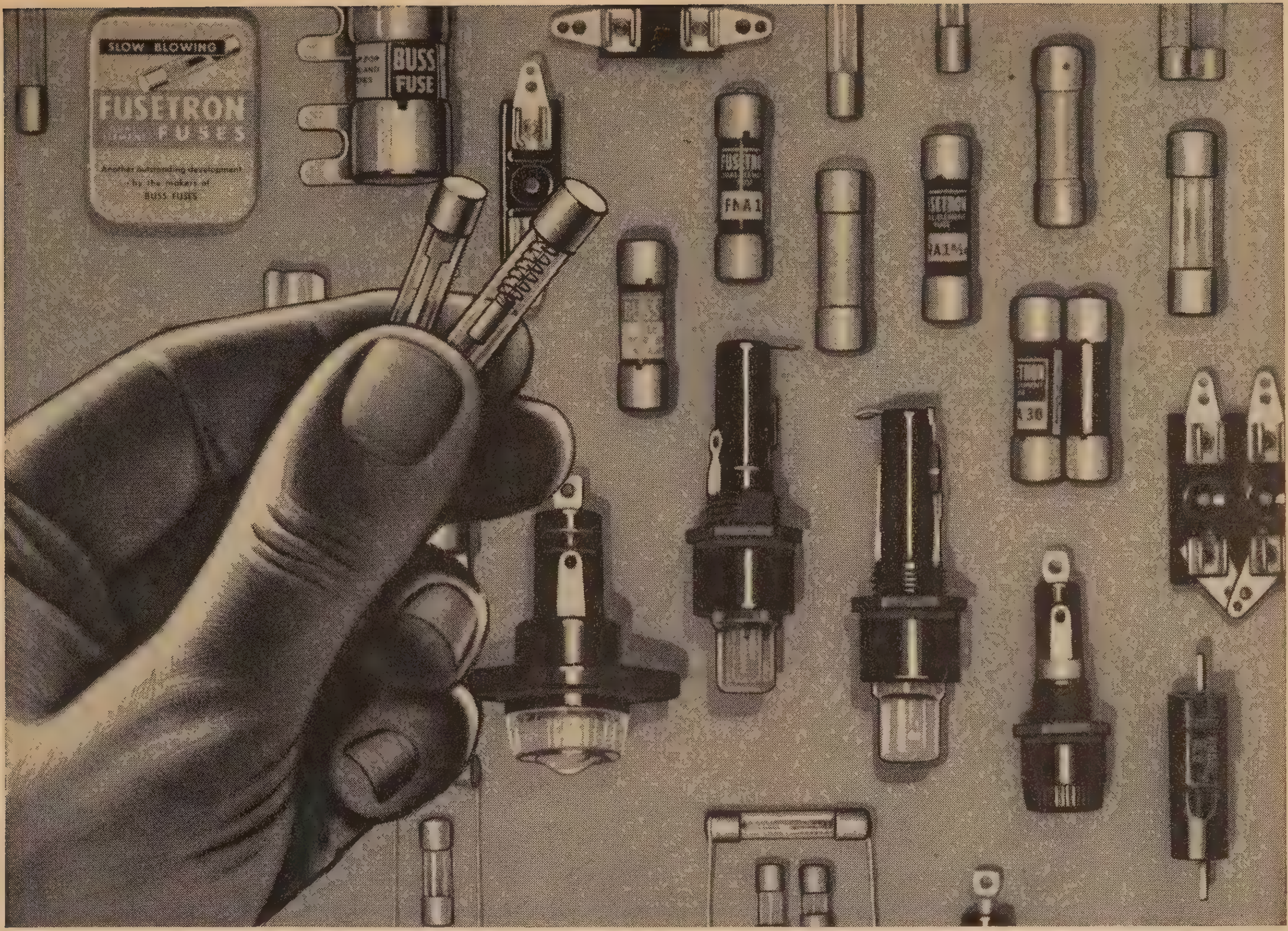
Lissajous Patterns

(*Continued from page 33*)

ually tuned towards an odd harmonic or fundamental frequency of the square wave, the closed square pattern is gradually developed. Fig. 4 shows what happens when the fundamental goes through a phase change. Not only does the frequency change when the audio generator frequency control knob is turned, but a complete cycle of phase change is experienced at the desired frequency. In many cases, the phase will drift even without any dial movement. As a result, the pattern may appear as a square and other assorted but related shapes from moment-to-moment. The closed square is used as a reference or guide post because it is more easily identified, and should appear at least momentarily.

Serifs

Phase variations around the second harmonic are shown in Fig. 5. Here again the reference pattern, will appear, at least part of the time. By examining both Fig. 4 and Fig. 5, it can be seen that it is possible to see and tell apart the fundamental from the second harmonic phase variations. Various shapes developed by the fundamental frequency have the intermediate point X above and point Y below the horizontal center line. In the case of the second harmonic, both points X and Y appear above and below this center line. Since it is not readily possible to predict which is point X and which is point Y on a scope, it is only necessary to see if the "serifs" extend to the right and left at the top and also on the bottom, or just to the right on top, and only to the left on the bottom. Polarity may be reversed on some scopes, but the basic concept is still the same. However, serifs do appear on both sides on all harmonics beyond the second including the 3rd, 4th, 5th, etc., but the open and closed pattern interpretations still apply. It can be shown that the closed and open forms will appear minus the serifs on odd and even harmonics respectively, and without any serifs, if the phase is just right. •



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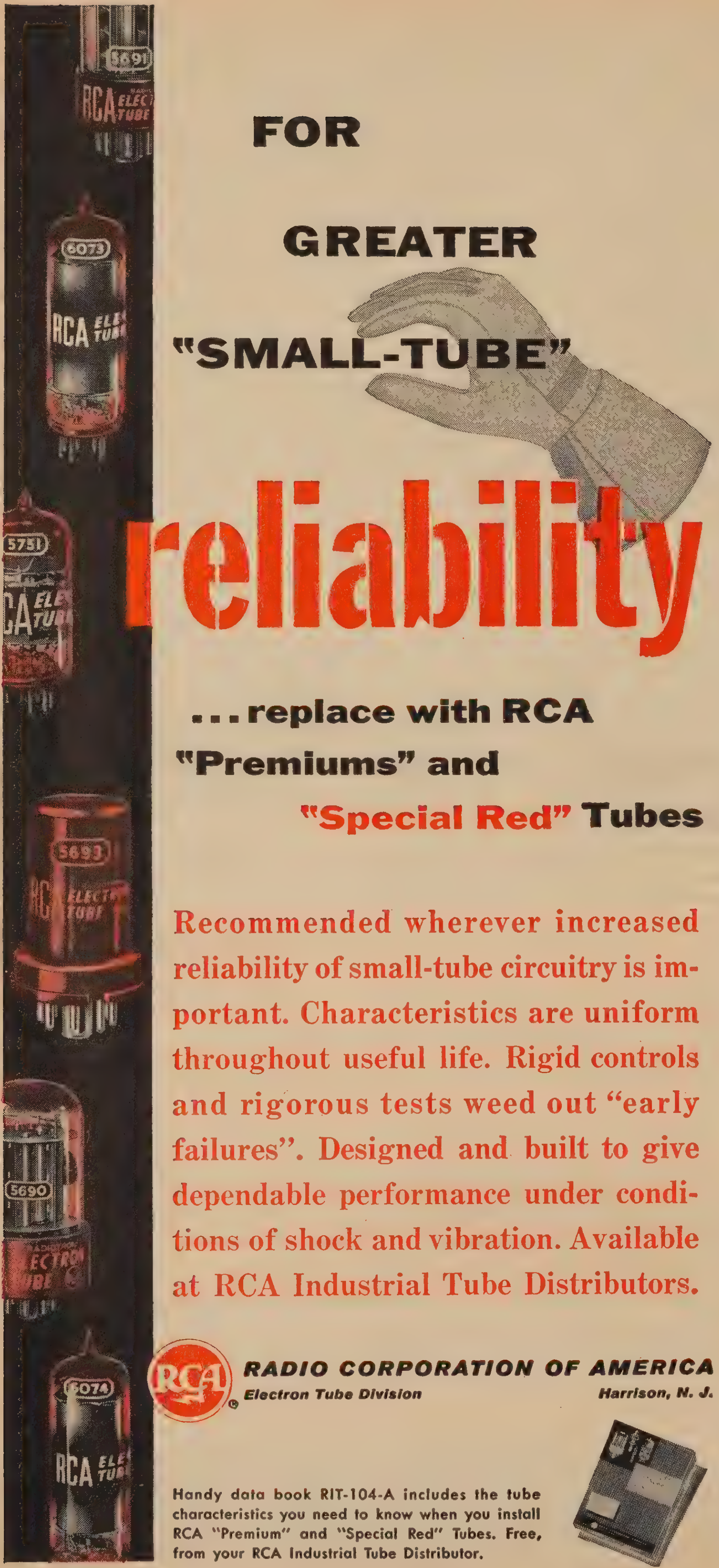
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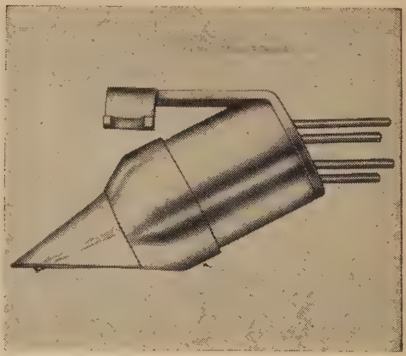
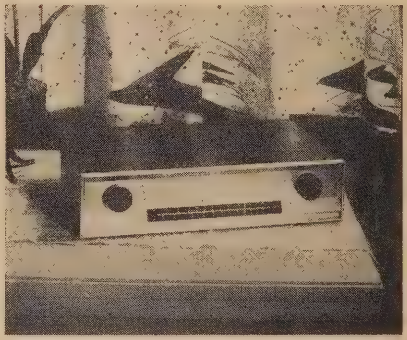


Erie TUNER

AM-FM tuner Model EM-085-ER features an etched wiring board, two i-f stages, limiter, and Foster-Seeley discriminator circuit. The company states that the 300 ohm balanced input, with tri-filar matching coil, eliminates the usual dual input stage, and that low noise level, strong control voltage, and high level of audio output signal, are outstanding characteristics. The cabinet is black with gold metallized-plastic front panel. There are only two front panel control knobs, with output control on the back panel. The cabinet is 12½″ x 9½″ x 3⅛″ and weight is 10½ lbs. Erie Resistor Corp., Erie, Pa. (ELECTRONIC TECHNICIAN 5-44)



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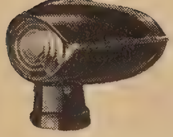
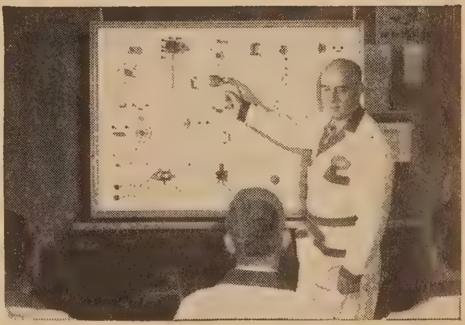


Courses for experienced service technicians provide latest repair information—enable you to do the job faster and more efficiently.



Jumbo-size operational panel of Guide's Autronic-Eye Circuit puts all parts out front for better, more efficient instruction.

Quick, accurate circuit diagnosis and repair to factory specifications boosts your profits. That's why so many qualified auto technicians attend these Guide training courses at no cost other than transportation and living expenses.

The Guide Lamp diploma, awarded only to those who successfully complete the course, is proof that you're equipped to give more and better service to more people—and that means business.

If you're an auto radio service dealer, come yourself, or send your technicians. There's one of 30 GM Training Centers near you. Apply through your local United Motors Service Division Distributor or write

GUIDE LAMP DIVISION • GENERAL MOTORS CORP. • ANDERSON, INDIANA

GENERAL MOTORS
TRAINING CENTER
BLINKY MEANS BUSINESS!

Thirty modern GM Training Centers offer newest equipment and latest service techniques. There's one nearby . . . no matter where you live.

SHIPPED ON APPROVA

IN-CIRCUIT CONDENSER TESTER

Model CT-1

AN ABSOLUTE 'MUST' FOR EVERY SERVICEMAN!

Here is an in-circuit condenser tester that does the whole job. The CT-1 actually steps in and takes over where all other in-circuit condenser testers fail. The ingenious application of a dual bridge principle gives the CT-1 a tremendous range of operation. . . .

CENTURY
IN-CIRCUIT CONDENSER TESTER
VALUE
FINE ADJ.
QUALITY

Model CT-1 — housed in sturdy hammertone finish steel case complete with test leads **$34.50 Net**

SIZE: W–6″ H–7″ D–3¼″

in-circuit checks:

- ✓ Quality of over 80% of all condensers even with circuit shunt resistance present . . . (leakage, shorts, opens, intermittents)
- ✓ Value of all condensers from 200 mmfd. to .5 mfd.
- ✓ Quality of all electrolytic condensers (the ability to hold a charge)
- ✓ Transformer, socket and wiring leakage capacity

out-of-circuit checks:

- ✓ Quality of 100% of all condensers . . . (leakage, shorts, opens and intermittents)
- ✓ Value of all condensers from 50 mmfd. to .5 mfd.
- ✓ Quality of all electrolytic condensers (the ability to hold a charge)
- ✓ High resistance leakage up to 300 megohms
- ✓ New or unknown condensers . . . transformer, socket, component and wiring leakage capacity

SPECIFICATIONS

• Ultra-sensitive 2 tube drift-free circuitry • Multi-color direct scale precision readings for both quality and value . . . (in-circuit or out of circuit) • Simultaneous readings of circuit capacity and circuit resistance • Built-in hi-leakage indicator sensitive to over 300 megohms • Cannot damage circuit components • Electronic eye balance indicator for even greater accuracy • Isolated power line

MINI-CHECK TUBE TESTE

Model MC-1

A Real *ECONOMY* MULTIPLE SOCKET TUBE TESTER without sacrifice in *ACCURACY, SPEED* or *VERSATILITY*

Here is a multiple socket tube tester designed to meet limited budgets. Although low in price it boasts a unique circuitry that enables you to check over 600 tube types — and has a range of operation that far exceeds others in its price class.

BAD GOOD
CENTURY
MINI-CHECK TUBE TESTER

Model MC-1 — housed in sturdy wrinkle finish steel case **$39.50 Net**

SIZE: W–9″
H–8½
D–2¾

SPECIFICATIONS

• Checks emission, inter-element shorts and leakage of over 600 tube This covers OZ4s, series-string TV tubes, gas regulators, auto 12 plate hi-fi and foreign tubes • 3 settings enable a test of any tube in less 10 seconds • Employs dynamic cathode emission test principles • D'Arsonval type meter — most accurate type available . . . its greater tivity means more accuracy . . . its jewel bearing means longer life • 17 lasting phosphor bronze tube sockets • Combination gas and short indicator • 9 filament positions • Handy tube chart contained in special compartment • New tube listings furnished periodically at no cost • tachable line cord

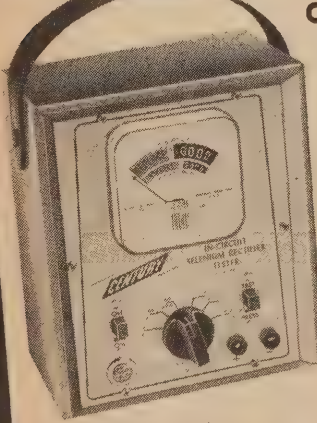
plus these BONUS FEATURES . . . found in no other low price tube tester

✓ Checks for cathode to heater shorts ✓ Checks for gas co ✓ Checks all sections of multiple purpose tubes . . . will pickup t with one "Bad" section ✓ Line isolated – no shock hazard ✓ able load control enables you to get accurate results on all t ✓ Positively cannot become obsolete as new tubes are introdu

IN-CIRCUIT RECTIFIER TESTER

Model SRT-1

Checks all power rectifiers in-circuit whether SELENIUM, GERMANIUM, SILICON, etc.



With the growing trend towards compactness, portability and low price, TV manufacturers are resorting more and more to producing series-string TV sets employing selenium, germanium or silicon power rectifiers. Now the need for an in-circuit rectifier tester is greater than ever.

THE SRT-1 CHECKS ALL POWER RECTIFIERS IN-CIRCUIT AND OUT-OF CIRCUIT WITH 100% EFFECTIVENESS FOR:

✓ Quality ✓ Fading ✓ Shorts ✓ Opens ✓ Arcing ✓ Life Expectancy

Model SRT-1—housed in sturdy hammertone finish steel case complete with test leads **$29.50 Net**

SIZE: W–6″ H–7″ D–3¼″

SPECIFICATIONS

- Checks all types of power rectifiers rated from 10 ma. to 500 ma. (selenium, germanium, silicon, etc.) both in-circuit or out-of-circuit.
- Will not blow fuses even when connected to a dead short.
- Large 3″ highly accurate multi-color meter . . . sensitive yet rugged.
- Separate meter scales for in-circuit and out-of-circuit tests.
- Cannot damage or over heat rectifier being tested.

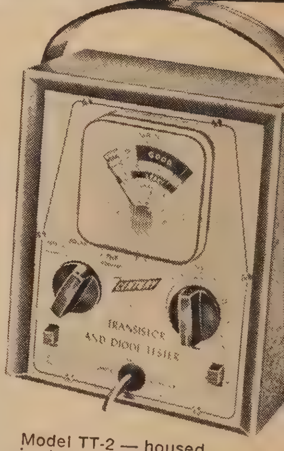
SIMPLE TO OPERATE Just clip SRT-1 test leads across rectifier under test right in the circuit without disconnecting rectifier from circuit. Press test switch and get an instant indication on the easy-to-read three-color meter scales. . . .

TRANSISTOR TESTER

Model TT-2

AN INEXPENSIVE QUALITY INSTRUMENT DESIGNED FOR ACCURATE AND DEPENDABLE TESTS OF ALL TRANSISTORS AND DIODES QUICKLY AND ACCURATELY

Every day more and more manufacturers are using transistors in home portable and car radios . . . in hearing aids, intercoms, amplifiers, industrial devices, etc. Since transistors can develop excessive leakage, poor gain, shorts or opens, the need for TRANSISTOR TESTER is great.



Model TT-2 — housed in sturdy hammertone finish steel case complete with test leads **$24**

SIZE: W–6″ H–7″ D–3¼″

SPECIFICATIONS

• Checks all transistors, including car radio, power output, triode, tetrode and unijunction types for current gain, leakage, opens, shorts, cut-off current • Checks all diodes for forward to reverse current gain • All tests can be made even if manufacturers' rated gain is not available • Less than half a minute required for tests of either transistors or diodes • Large 3″ meter is extremely sensi yet rugged . . . with multi-color scales designed for quick easy readi • Power is supplied by an easy to replace 6-volt battery — current d so small, service life almost equal to shelf life. Battery cannot be drai due to accidental shorting of test leads • Cannot burn-out its own mete damage transistor or diode under test • Long test leads and insulated clips enable tests without entirely removing transistor from circuit • T leads are identified by E.I.A. color code so that connection to the corr terminal is assured • Comes complete with replaceable transistor set- chart that fits into a special rear compartment.

IMPORTANT FEATURE: The TT-2 cannot become obsolete the circuitry is engineered to ena you to check all new type transistors as they are introduced. New listi will be furnished periodically at no cost.

EASY TO BUY IF SATISFIED

see order form on facing page

OR 10 DAY *FREE* TRIAL

Convince yourself at no risk that CENTURY instruments are indispensable in your every day work. Send for instruments of your choice without obligation . . . try them for 10 days before your buy . . . only then, when satisfied, pay in easy-to-buy monthly installments — without any financing or carrying charges added.

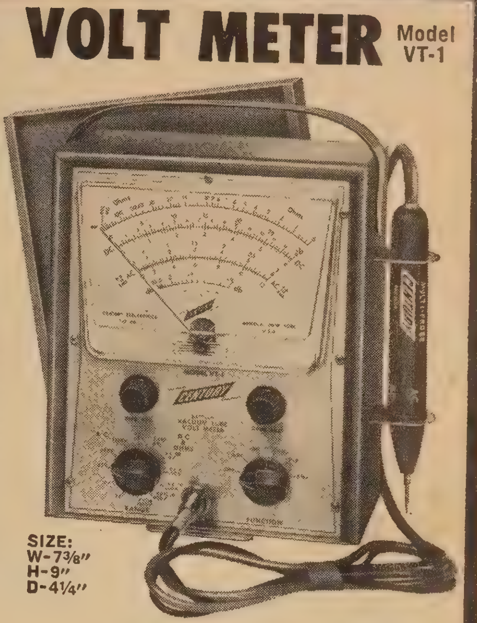
IEW Battery Operated Peak-to-Peak VACUUM TUBE VOLT METER Model VT-1

WITH LARGE EASY-TO-READ 6″ METER —

›aturing the sensational new *MULTI-PROBE* * Patent Pending

No extra probes to buy! The versatile MULTI-PROBE does the work of 4 probes

DC Probe ❷ AC Probe ❸ Lo-Cap Probe ❹ RF Probe



The VT-1 is a tremendous achievement in test equipment. With its unique MULTI-PROBE it will do all the jobs a V.T.V.M. should do without the expense of buying additional probes. No longer do you ɩave to cart around a maize of entangled cables, lose time alternating cables or hunting for a mis›laced probe. With just a twist of the MULTI-PROBE tip you can set it to do any one of many time›aving jobs. A special holder on side of case keeps MULTI-PROBE firmly in place ready for use.

FUNCTIONS

C VOLTMETER . . . Will measure D.C. down to volts full scale with minimum circuit loading, l give accurate readings of scale divisions as low .025 volts . . . Will measure low AGC and oscillator s voltages from .1 volts or less up to 1500 volts h consistent laboratory accuracy on all ranges . . . o center provided for all balancing measurements ch as discriminator, ratio detector alignment and fi amplifier balancing.

C VOLTMETER . . . True Peak-to-Peak measurents as low as 3 volts of any wave form including sync, deflection voltages, video pulses, distortion ni-fi amplifiers, AGC and color TV gating pulses . . . ıle divisions are easily read down to .1 volts . . . asures RMS at 1/20th the circuit loading of a .M. . . . Unlike most other V.T.V.M.'s there is no s in accuracy on the lowest AC range.

ECTRONIC OHMETER . . . Measures from 0 1000 megohms . . . Scale divisions are easily read wn to .2 ohms . . . Will measure resistance values n .2 ohms to one billion ohms . . . Will detect h resistance leakage in electrolytic and by-pass densers.

and LO-CAP MEASUREMENTS . . . h these extra VT-1 functions you can measure ages in extremely high-impedance circuits such sync and AGC pulses, driving saw tooth voltages, r TV gating pulses, mixer output levels, I.F. ge-by-stage gain and detector inputs.

OUTSTANDING FEATURES

• Completely portable — self powered with long life batteries — permits use everywhere • New advanced pentode amplifier circuit assures amazingly low battery drain • Large 6″ 100-microampere meter, many times more sensitive than meters used in most V.T.V.M.'s • Laboratory accuracy performance — 2% of full scale on DC, 5% of full scale on AC • Simplified multi-color easy-to-read 4-scale meter • No heat operation assures rigid stability and accuracy • Immune to power line fluctuations • Amplifier rectifier circuit with frequency compensated attenator — a feature found only in costly laboratory instruments • Meter completely isolated — practically burn-out proof • Hand-crafted circuitry eliminates the service headaches of printed circuitry • 1% resistors used for permanent accuracy • Separate RF ground return for low-loss RF measurement • Microphone type co-axial connector • Matching cover protects instrument face — snaps on and off instantly.

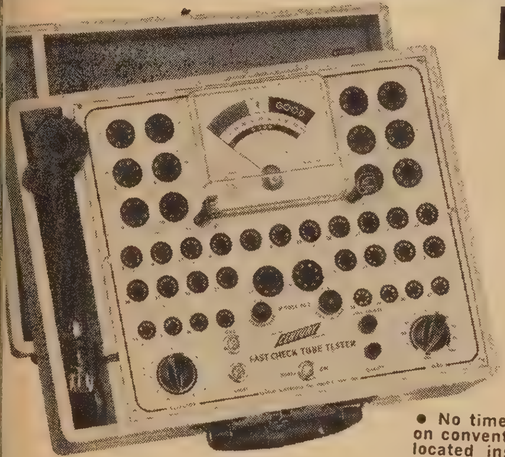
SIZE:
W-7⅜″
H-9″
D-4¼″

SPECIFICATIONS

- DC Volts — 0 to 1.5/6/30/150/300/600/1500 volts
- AC Volts (RMS and Peak-to-Peak) — 0 to 3/12/60/300/1200 volts
- Ohms — 0 to a billion ohms, 10 ohms center scale — Rx1/10/100/1K/10K/100K/1M
- RF — Peak reading demodulator supplied for use on all DC ranges
- Zero Center — available on all DC volt ranges with zero at mid-scale
- Decibels — from —10 Db to +10/22/36/50/62 based on the Dbm unit: ODb-IMW in 600 ohms
- Impedance — 11 megohms DC, 1 megohm AC, 10 megohms Lo-Cap
- Input Capacity — 130 mmfd. RMS, 250 mmfd. Peak-to-Peak, 25 mmfd. Lo-Cap

Model VT-1 — fully wired and calibrated, housed in handsome hammertone finish steel case, complete with MULTI-PROBE,and thorough instruction manual covering all the applications in detail. **$58.50 Net**

FAST-CHECK TUBE TESTER Model FC-2



SIZE: W—14⅝″ H—11¼″ D—4⅜″

del FC-2 — housed in handbed oak carrying case comte with CRT adapter **$69.50 Net**

Simply set two controls . . . insert tube . . . and press quality button to test any of over 700 tube types completely, accurately . . . IN JUST SECONDS!

Over 20,000 servicemen are now using the FAST-CHECK in their every day work and are cutting servicing time way down, eliminating unprofitable call-backs and increasing their dollar earnings by selling more tubes with very little effort. See for yourself at no risk why so many servicemen chose the FAST-CHECK above all other tube testers.

PICTURE TUBE TEST ADAPTER INCLUDED WITH FAST-CHECK

Enables you to check all picture tubes (including the new short-neck 110 degree type) for cathode emission, shorts and life expectancy . . . also to rejuvenate weak picture tubes.

RANGE OF OPERATION

- ✓ Checks quality of over 700 tubes types, employing the time proven dynamic cathode emission test. This covers more than 99% of all tubes in use today, including the newest series-string TV tubes, auto 12 plate-volt tubes. OZ4s, magic eye tubes, gas regulators, special purpose hi-fi tubes and even foreign tubes.
- ✓ Checks for inter-element shorts and leakage.
- ✓ Checks for gas content.
- ✓ Checks for life-expectancy.

SPECIFICATIONS

• No time consuming multiple switching . . . only two settings are required instead of banks of switches on conventional testers • No annoying roll chart checking . . . tube chart listing over 700 tube types is located inside cover. New listings are added without costly roll chart replacement • Checks each section of multi-section tubes and if only one section is defective the tube will read "Bad" on the meter scale • 41 phosphor bronze beryllium tube sockets never need replacement • 7-pin and 9-pin straighteners mounted on panel • Large 4½″ D'Arsonval type meter is the most sensitive available, yet rugged — fully protected against accidental burn-out • Special scale on meter for low current tubes • Compensation for line voltage variation • 12 filament positions • Separate gas and short jewel indicators • Line isolated — no shock hazards • Long lasting etched aluminum panel.

NOTE: The Fast-Check positively cannot become obsolete . . . circuitry is engineered to accommodate all future tube types as they come out. New tube listings are furnished periodically at no cost.

CONVENIENT TIME PAYMENT PLAN — NO FINANCING CHARGES

LL CENTURY NSTRUMENTS ARE UARANTEED FOR NE FULL YEAR

he extremely low rices are made ossible because ou are buying diect from the nanufacturer.

CENTURY ELECTRONICS CO., INC.

CHECK INSTRUMENTS DESIRED

☐ Model CT-1 In-Circuit Condenser Tester $34.50
$9.50 within 10 days. Balance $5 monthly for 5 months.
☐ Model MC-1 Mini-Check Tube Tester $39.50
$9.50 within 10 days. Balance $6 monthly for 5 months.
☐ Model SRT-1 In-Circuit Rectifier Tester $29.50
$4.50 within 10 days. Balance $5 monthly for 5 months.
☐ Model TT-2 Transistor Tester $24.50
$4.50 within 10 days. Balance $5 monthly for 4 months.
☐ Model VT-1 Battery Vacuum Tube Volt Meter $58.50
$14.50 within 10 days. Balance $11 monthly for 4 months.
☐ Model FC-2 Fast-Check Tube Tester $69.50
$14.50 within 10 days. Balance $11 monthly for 5 months.

Prices Net F.O.B. Mineola, N. Y.

111 Roosevelt Avenue, Dept. 505, Mineola, New York

Please rush the instruments checked for a 10 day free trial. If satisfied I agree to pay the down payment within 10 days and the monthly installments as shown. If not completely satisfied I will return the instruments within 10 days and there is no further obligation. It is understood there will be NO INTEREST or FINANCING charges added.

Name .... Please print clearly

Address ....

City .... State ....

For Checking Miniaturized Equipment, Pyramid's Model RC-1 New Resistance-Capacity-Ratio Bridge Tester. Budget priced . . . outstanding quality instrument . . . the RC-1 saves you both time and money. Precision-engineered, Pyramid's new model RC-1, Resistance-Capacity-Ratio Bridge Tester has a special low voltage bridge and stable vacuum tube amplifier for safe testing low voltage electrolytics such as commonly used in transistorized receivers.

Pyramid's RC-1, Resistance-Capacity-Ratio Bridge Tester is a functionally designed, sturdy, compact, lightweight unit, ideal for use by technicians, servicemen and engineers in radio, television (color as well as black and white), industrial electronics and all related fields.

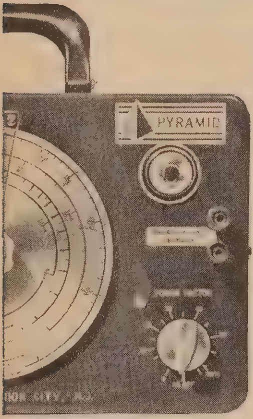
PYRAMID MODEL RC-1 FEATURES:

- Special 3 volt amplifier for checking low voltage electrolytics used in miniaturized equipment such as transistor radios, etc.
- Capacity Ranges—from 10 mmfd. to 2000 mfd.
- Resistance—from .5 ohms to 200 megohms in 4 ranges.
- Ratio Test—provides quick reactance or resistance ratio between any two capacitors, inductors or resistors —range: .05 to 1 and 20 to 1. It can be used also to determine turns ratio of transformer windings within this range.
- Leakage Tests—handles all types of capacitors at rated voltages between 0 and 500V DC.
- Power Factor—0 to 60% (on capacitors from .1 mfd to 2000 mfd).
- Capacitor Test Voltages—variable between 0 and 500V DC in 17 steps.

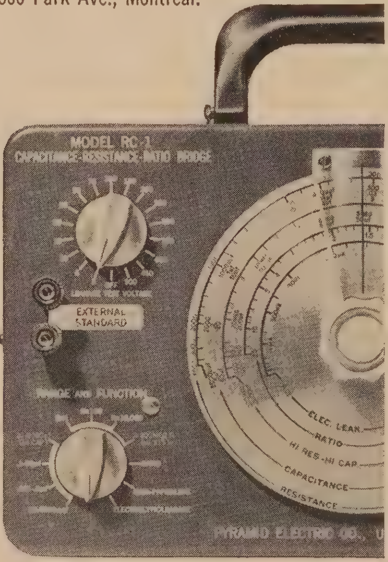
PRICE: Dealer Net—$44.95

For further information about the RC-1 see your Pyramid distributor or write for complete technical data to: Pyramid Electric Company, Union City, N. J. EXPORT: 458 Broadway, N. Y. 13, N. Y. • CANADA: Wm. Cohen, Ltd.—7000 Park Ave., Montreal.

Parts Show; Booth 419



BURTON BROWNE/New York



PYRAMID
CAPACITY-RES LEAKAGE
POWER FACTOR
UNION CITY, N.J.

PYRAMID
ELECTRIC CO.

GE SILICON RECTIFIERS

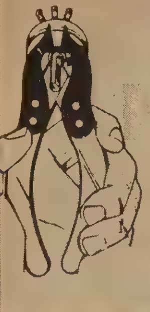
Fifty-eight additional types of low current silicon rectifier cells featuring low reverse current leakage are now in production. 20 are pig-tail, and 38 stud-mount. The new pig-tail lead types are JEDEC-designated IN599 through IN606 inclusive, IN599A through IN606A inclusive, and IN1100 through IN337; inclusive. Designations on the stud-mount types are IN332 through IN337; IN339 through IN346; IN348; IN349; IN550 through IN555; IN607 through IN614, and IN607A through IN614A. PIV ranges up to 600 v., currents to 500 ma. General Electric Semiconductor Products Dept., Syracuse, N.Y. (ELECTRONIC TECHNICIAN 5-45)

DuMont DUAL-BEAM SCOPE

A dual-beam oscilloscope is capable of displaying x-y plots and simultaneously displaying either the x- or y- signal against time. A unique switching arrangement on the front panel of the Type 411 develops nine major modes of display. By introducing Z-axis modulation, 27 additional useful display modes are possible. Expanded sweeps and calibrated sweeps may be independently positioned while being displayed simultaneously. Frequency range is dc to 100 kc. Allen B. DuMont Labs., Inc., 750 Bloomfield Ave., Clifton, N. J. (ELECTRONIC TECHNICIAN 5-41)

Telco ANTENNA MOUNT

The "G-C Telco Tri-Roof Mount" is designed to fit all roofs and wall surfaces quickly and easily. Mount and mast are included in one aluminum installation; light weight and easy to handle, it goes up in minutes with the aid of speed nails and a hammer. The mount, No. A 8173, carries a list price of $4.50; in a kit containing lead wire, standoffs, nails and lightning arrestor (No. A-328), it lists for $9.95. Telco Electronics Mfg. Co. (div. G-C Textron), 400 S. Wyman St., Rockford, Ill. (ELECTRONIC TECHNICIAN 5-37)



NEW WALSCO C-RING TOOL

For easy removal and insertion of "C" washers and retaining rings. Use everywhere.

No. 585........List $3.15

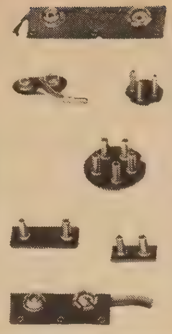
WALSCO TEL-A-TURN TOOLS

For set alignments, count turns automatically to right or left.

No. 2586—I.F. aligner, #4 & #6 studs....List $1.65
2587—Screwdriver & 7/64" blade....List $1.65
2588—Hex aligner, .100" & .125".....List $1.65

WALSCO TEKNI-LABELS

Wide variety of titles and designs for quick labeling of electronic equipment. Choice of 9 different assortments, each with hundreds of decals.



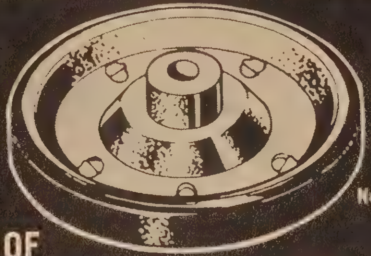
WALSCO BATTERY PLUGS

Plugs to fit all popular batteries. 18 different types including regular, snap connectors, female plugs.

Walsco ELECTRONIC PRODUCTS

ALWAYS QUALITY-RIGHT... PRICED RIGHT!

No. 1472
No. 1462



No. 1432

THE ONLY COMPLETE LINE OF REPLACEMENT PHONO AND RECORDER DRIVES AND BELTS

Take care of all your phono drive replacements with the WALSCO line . . . largest and most complete line on the market.

No. 1447

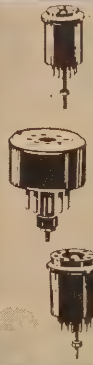
WALSCO STRIP-ER-CLIP

Strips and clips all wire from 14 to 26 gauge. No accidental nicks or cuts.

No. 595.....List $2.30

WALSCO STICKLEBACK TOOLS

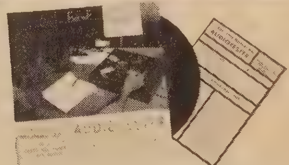
Drill, saw, file and rout faster and easier with these remarkable tools made from tough alloy steel. Choice of 6 drill routers, 4 drillsaws, rasp and combination.



WALSCO SOCKET PROTECTORS

Prevent excess wear and tear on tube checker sockets and other equipment.

No. 1946—7-pin mini.	List $3.25
1947—8-pin octal.	3.25
1948—9-pin mini.	3.25



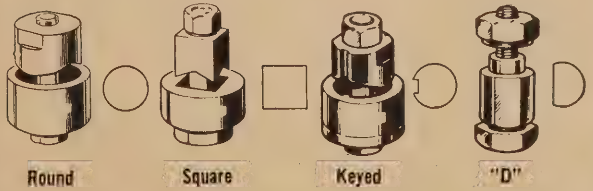
NEW WALSCO "AUDIOTESTER" TEST RECORD

High fidelity LP record for checking playback equipment from needle to speaker. Mono bands on one side, stereo on reverse.

No. 300—..........Audiophile Net $3.98

WALSCO CHASSIS PUNCHES

featuring exclusive Walsco L.T.* design



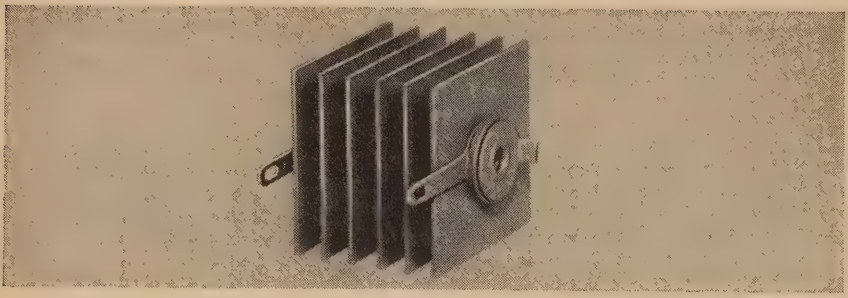
*"Low-Torque" Electro-Coating requires 50% less punching effort.

FREE! Send for your copy of the new Color TV Tool Manual and Walsco Catalog 59. Send postcard today!

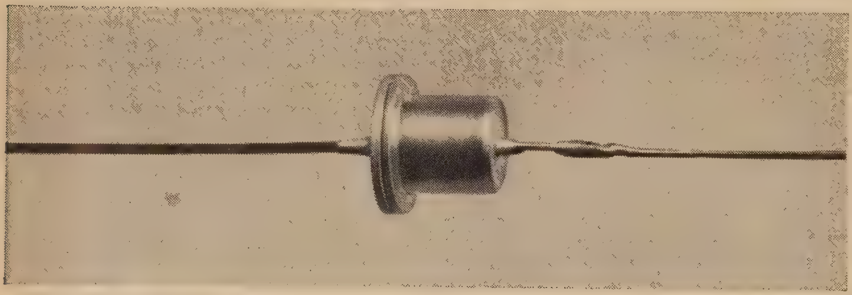
Walsco ELECTRONICS MFG. CO.
Division of Textron Inc.
Western Plant: Los Angeles 18, Calif.
Main Plant: ROCKFORD, ILLINOIS, U.S.A.

YOU CAN GET WHAT YOU WANT FROM WALSCO!

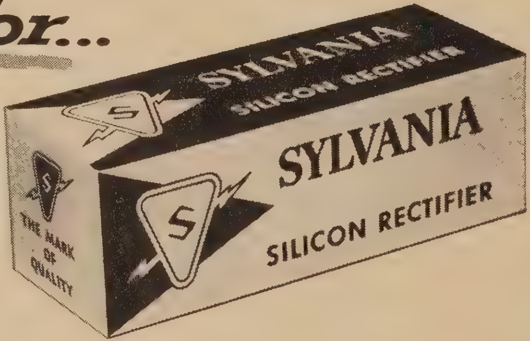
Next time you replace a...



with a



ask for...



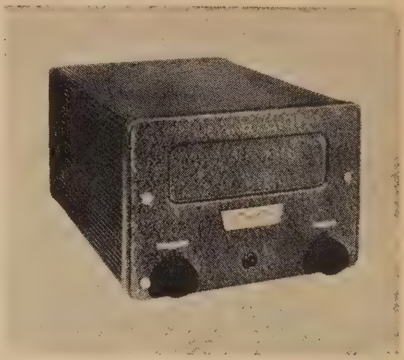
With just two Sylvania silicon rectifier types, SR200 and SR500, you can replace over 83 selenium rectifier types made by 5 different manufacturers. Type SR200 with a maximum rating of 200ma, 300 v is intended for low-voltage general purpose applications. Type SR500 with a maximum rating of 500ma, 400 v is designed for medium-power rectifier applications. Both types are in stock at your authorized Sylvania distributor. Get your free copy of Sylvania's Selenium Rectifier Replacement Guide from your Sylvania Distributor or write Sylvania direct—1100 Main St., Buffalo, N. Y.

SYLVANIA
Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

Sylvania Electric Products Inc.
Semiconductor Division
100 Sylvan Rd., Woburn, Mass.

Monitor MOBILE FM

Two crystal controlled mobile FM receivers for continuously monitoring any single frequency in the 30-50 (Model MC-40) or 152-174 (MC-160) bands cover police, fire, utility, etc. Features double conversion, r-f stage, built in squelch and 4" pm speaker. Sensitivity (for 20 db quieting), Model MC-40 2, μv; Model MC-160 4, μv. Selectivity ±40 kc at 20 db. Price of either unit is $114.50, including crystal. Monitoradio Div. of I. D. E. A., Inc., 7900 Pendleton Pike, Indianapolis 26, Ind. (ELECTRONIC TECHNICIAN 5-46)



Mallory LEAKPROOF BATTERY

A steel-encased battery, designed for flashlights, radios and general use where long life and reliability are desired, is leakproof and corrosion-proof. It stands up under severe conditions of heat and humidity. This model M13 battery has a bright chrome finish with the added color of red and blue on its jacket design. It is a size D dry cell. Mallory Battery Co., 13000 Athens Ave., Cleveland 7, Ohio. (ELECTRONIC TECHNICIAN 5-47)

MALLORY
Leakproof

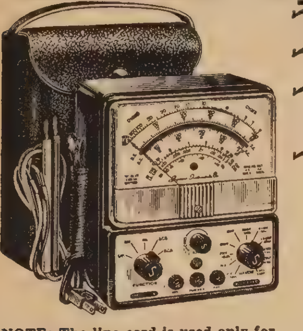
Burgess BATTERY DISPLAY

Two new metal self-service display racks merchandise steel jacketed D-cell flashlight batteries. A wall mounted display holds 24 standard flashlight batteries, and a triple-tier counter top merchandiser holds 48. Both sales aids are constructed of heavy gauge metal rod with a permanent gold finish and require a minimum of attention by store personnel. The units come completely assembled. Burgess Battery Co., Freeport, Ill. (ELECTRONIC TECHNICIAN 5-48)

SUPERIOR'S NEW MODEL 80

20,000 OHMS PER VOLT ALLMETER

THE *ONLY* 20,000 OHMS PER VOLT V.O.M. SELLING FOR LESS THAN $50 WHICH PROVIDES *ALL* THE FOLLOWING FEATURES:



- ✓ **6 INCH FULL-VIEW METER** provides large easy-to-read calibrations. No squinting or guessing when you use Model 80.
- ✓ **MIRRORED SCALE** permits fine accurate measurements where fractional readings are important.
- ✓ **CAPACITY RANGES** permit you to accurately measure all condensers from .00025 MFD to 30 MFD in addition to the standard volt, current, resistance and decibel ranges.
- ✓ **HANDSOME SADDLE-STITCHED CARRYING CASE** included with Model 80 Allmeter at no extra charge enables you to use this fine instrument on outside calls as well as on the bench in your shop.

SPECIFICATIONS:

7 D.C. VOLTAGE RANGES
(At a sensitivity of 20,000 Ohms per Volt)
0 to 15/75/150/300/750/1500/7500 Volts.

6 A.C. VOLTAGE RANGES:
(At a sensitivity of 5,000 Ohms per Volt)
0 to 15/75/150/300/750/1500 Volts.

3 RESISTANCE RANGES:
0 to 2,000/200,000 Ohms. 0-20 Megohms.

2 CAPACITY RANGES:
.00025 Mfd. to .3 Mfd., .05 Mfd. to 30 Mfd.

5 D.C. CURRENT RANGES
0-75 Microamperes, 0 to 7.5/75/750 Milliamperes, 0 to 15 Amperes.

3 DECIBEL RANGES:
— 6 db to + 18 db. + 14 db to + 38 db + 34 db to + 58 db

NOTE: The line cord is used only for capacity measurements. Resistance ranges operate on self-contained batteries.

FEATURES:

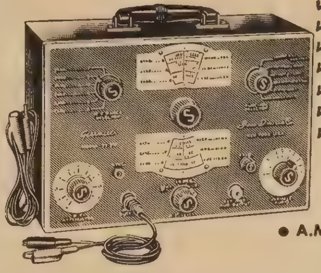
- A built-in Isolation Transformer automatically isolates the Model 80 from the power line when capacity service is in use.
- Selected, 1% zero temperature coefficient metalized resistors are used as multipliers to assure unchanging accurate readings on all ranges.

Model 80 Allmeter comes complete with operating instructions, test leads and portable carrying case. Only $42.50

SUPERIOR'S NEW MODEL TV-50A

GENOMETER

7 Signal Generators in One!



- ✓ **R.F. Signal Generator for A.M.**
- ✓ **R.F. Signal Generator for F.M.**
- ✓ **Audio Frequency Generator**
- ✓ **Marker Generator**
- ✓ **Bar Generator**
- ✓ **Color Dot Pattern Generator**
- ✓ **Cross Hatch Generator**

This Versatile All-Inclusive GENERATOR Provides ALL the Outputs for Servicing:

● A.M. RADIO ● F.M. RADIO ● AMPLIFIERS ● BLACK AND WHITE TV ● COLOR TV

R. F. SIGNAL GENERATOR: 100 Kilocycles to 60 Megacycles on fundamentals and from 60 Megacycles to 180 Megacycles on powerful harmonics.

VARIABLE AUDIO FREQUENCY GENERATOR: Provides a variable 300 cycle to 20,000 cycle peaked wave audio signal.

MARKER GENERATOR: The following markers are provided: 189 Kc.; 262.5 Kc., 456 Kc., 600 Kc., 1000 Kc., 1400 Kc., 1600 Kc., 2000 Kc., 2500 Kc., 3579 Kc., 4.5 Mc., 5 Mc., 10.7 Mc., (3579 Kc. is the color burst frequency.)

BAR GENERATOR: Pattern consists of 4 to 16 horizontal bars or 7 to 20 vertical bars.

DOT PATTERN GENERATOR (FOR COLOR TV): The Dot Pattern projected on any color TV Receiver tube by the Model TV-50A will enable you to adjust for proper color convergence.

CROSS HATCH GENERATOR: The pattern consists of non-shifting horizontal and vertical lines interlaced to provide a stable cross-hatch effect.

The Model TV-50A comes complete with shielded leads and operating instructions. Only $47.50

SUPERIOR'S NEW MODEL 77

VACUUM TUBE VOLTMETER

WITH NEW 6" FULL-VIEW METER

Compare it to *any* peak-to-peak V. T. V. M. made by *any* other manufacturer at *any* price!

- Uses new improved SICO printed circuitry.
- Employs a 12AU7 as D.C. amplifier and two 9006's as peak-to-peak voltage rectifiers to assure maximum stability
- Meter is isolated from the measuring circuit by a balanced push-pull amplifier.
- Uses selected 1% zero temperature coefficient resistors as multipliers.

AS A DC VOLTMETER: The Model 77 is indispensable in Hi-Fi Amplifier servicing and a must for Black and White and color TV Receiver servicing where circuit loading cannot be tolerated.

AS AN ELECTRONIC OHMMETER: Because of its wide range of measurement leaky capacitors show up glaringly. Because of its sensitivity and low loading, intermittents are easily found, isolated and repaired.

SPECIFICATIONS

• DC VOLTS — 0 to 3/15/75/150/300/750/1,500 volts at 11 megohms input resistance. • AC VOLTS (RMS) — 0 to 3/15/75/150/300/750/1,500 volts. • AC VOLTS (Peak to Peak) — 0 to 8/40/200/400/800/2,000 volts. • ELECTRONIC OHMMETER — 0 to 1,000 ohms/10,000 ohms/100,000 ohms/1 megohm/10 megohms/100 megohms/1,000 megohms. • DECIBELS —10 db to + 18 db, + 10 db to + 38 db, + 30 db to + 58 db. All based on 0 db = .006 watts (6 mw) into a 500 ohm line (1.73v). • ZERO CENTER METER — For discriminator alignment with full scale range of 0 to 1.5/7.5/37.5/75/150/375/750 volts at 11 megohms input resistance.

AS AN AC VOLTMETER: Measures RMS value if sine wave, and peak-to-peak value if complex wave. Pedestal voltages that determine the "black" level in TV receivers are easily read.

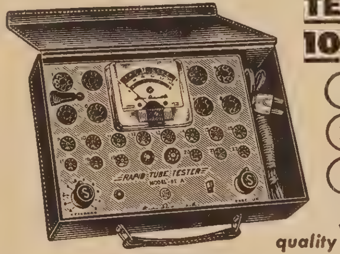
Comes complete with operating instructions, probe, leads, and steamlined carrying case. Operates on 110-120 volt 60 cycle. Only.. $42.50

SUPERIOR'S NEW MODEL 82A

Multi-Socket Type

TUBE TESTER

TEST ANY TUBE IN 10 SECONDS FLAT!



① Turn the filament selector switch to position specified.

② Insert tube into a numbered socket as designated on our chart (over 600 types included).

③ Press down the quality button—

THAT'S ALL!* *Read emission quality direct on bad-good meter scale.

SPECIFICATIONS

- Tests over 600 tube types
- Tests OZ4 and other gas-filled tubes
- Employs new 4" meter with sealed air-damping chamber resulting in accurate vibrationless readings
- Use of 22 sockets permits testing all popular tube types and prevents possible obsolescence
- Dual Scale meter permits testing of low current tubes
- 7 and 9 pin straighteners mounted on panel
- All sections of multi-element tubes tested simultaneously
  Ultra-sensitive leakage test circuit will indicate leakage up to 5 megohms

Production of this Model was delayed a full year pending careful study by Superior's engineering staff of this new method of testing tubes. Don't let the low price mislead you! We claim Model 82A will outperform similar looking units which sell for much more — and as proof, we offer to ship it on our examine before you buy policy.

To test any tube, you simply insert it into a numbered socket as designated, turn the filament switch and press down the quality switch — THAT'S ALL! Read quality on meter. Inter-element leakage if any indicates automatically.

Model 82A comes housed in handsome, portable Saddle-Stitched Texon case. Only $36.50
(Picture Tube Adapter available for $5.50 additional)

SHIPPED ON APPROVAL

NO MONEY WITH ORDER—NO C.O.D.

Try any of the above instruments for 10 days *before* you buy. If completely satisfied *then* send down payment and pay balance as indicated on coupon. *No Interest or Finance Charges Added!* If not completely satisfied return unit to us, no explanation necessary.

MOSS ELECTRONIC, INC.
Dept. D-606 3849 Tenth Ave., New York 34, N. Y.

Please send me the units checked on approval. If completely satisfied I will pay on the terms specified with no interest or finance charges added. Otherwise, I will return after a 10 day trial positively cancelling all further obligations.

Name ....

Address ....

City ....Zone....State..............

All prices net, F.O.B., N. Y. C.

☐ **Model 80...Total Price $42.50 $12.50 within 10 days. Balance $6.00 monthly for 5 months.**

☐ **Model TV-50A...Total Price $47.50 $11.50 within 10 days. Balance $6.00 monthly for 6 months.**

☐ **Model 77...Total Price $42.50 $12.50 within 10 days. Balance $6.00 monthly for 5 months.**

☐ **Model 82A...Total Price $36.50 $6.50 within 10 days. Balance $6.00 monthly for 5 months.**

☐ **Include Model 82A Picture Tube Adapter at $5.50**

These two speakers are BRAND NEW and BRAND NAME and the BRAND NAME is QUAM

Here are two new additions to the famous Quam line of replacement speakers. You'll find many uses for both of them, in auto radios and in radio-tv applications. When you use them, you'll enjoy knowing that you're avoiding breakdowns and eliminating callbacks by installing *quality* loudspeakers. Using a brand name product is always your assurance of that . . . especially when the brand name is QUAM.

48A2—Very shallow construction 4" x 8" speaker with 1.4 oz. Alnico V magnet. Used in many 1959 auto radios and in RCA and Sylvania sets. List Price $6.95

69A1—A low cost 6" x 9" speaker with "high-price" features—full 3/4" voice coil, heavy magnet (1 oz. Alnico V). An exceptional value. List Price $5.95

ask for QUAM, the quality line for all your speaker needs

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Check all ELECTROLYTIC CAPACITORS in Seconds!

Model ES-102
ONLY $15.95 DEALER NET
Less than you pay for the individual capacitors.
Carry it anywhere— measures only 4¾" H x 4¾" W x 2¼" D

Merely select the electrolytic and substitute it. 10 big electrolytics from 4 to 350 Mfd. to safely substitute in any circuit from 2 to 450 volts.

. . . COMPLETELY SAFE—no arc or spark when connecting or disconnecting.

. . . AUTOMATIC CAPACITOR DISCHARGE—within seconds after releasing test switch by, unique surge protector circuit.

. . . NO CAPACITOR HEALING—surge protector circuit prevents accidental healing of capacitor being "bridged" in service work.

Available at Parts Distributors.

See other SENCORE ads in this issue.

SERVICE INSTRUMENTS CORP. 121 Official Rd. • Addison, Ill.

Parts Show

(Continued from page 38)

Company	Booth	Room
Equipto	682	
Ercona Corp.	4	665
Eric Eng'g		624
Erie Resistor		512
Fanon Electric Co.		639A
Ferrodynamics Corp.		635A-636A
Fidelitone	308	
Finney Co.		647 & 649
Fisher Radio Corp.		661A
Freed Transformer Co.	578	
G-C Electronic Mfg.	118	
General Cement Mfg. Co.	422	621-622
General Electric Co.	209	626A
General Industries Co.		653 & 655
General Transistor Distr'g Corp.		623
Gernsback Publications	107	504
Globe Electronics	871	
Gramer-Halldorson Transformer Corp.	413	
Granco Products		621A
Grayhill		556-557
Great Eastern Mfg. Co.		635
Guardian Electric Mfg. Co.	214	
Edward E. Gurian & Co.	780	
Hallicrafters Co.		539 & 553
Hammarlund Mfg. Co.	673	613A
Hardwick, Hindle	220	
Harman-Kardon		505A-507A
Hexacon Electric Co.	885	
Hickok Electrical Instrument Co.	320	
Hi-Lo Mfg. Corp.	216	
H.I.S. Industries	2	
Hy-Gain Antenna Products	873	
I.D.E.A.		560A-561A
IE Mfg.	24	
Illinois Condenser Co.	306	
IT & T Components Div.	405	
International Electronics Corp.		656A
International Rectifier Corp.	1	
International Resistance Co.	582	
Jackson Elec'l Instrument Co.	218	
James Vibrapowr Co.	206	
J-B-T Instruments	580	
Jensen Industries	408	513
Jensen Mfg. Co.	680	605A-607A
Jerrold Electronics Corp.	671	
Jersey Specialty Co.		639
JFD Electronics Corp.	418	
Jobber News & Electronic Wholesaling	307	
E. F. Johnson Co.	22	549
Kester Solder Co.	119	
Mathias Klein & Sons	27	
Kurman Electric Co.	887	
Lab-Tronics		633A
Lance Antenna Mfg. Co.	874	
James B. Lansing Sound		500-501
Lerco Electronics	875	
Licon Switch & Control Div.	781	
Littelfuse	415	
Lowell Mfg. Co.		602A
Luminite Div. Chicopee Mills	12	
Luxo Lamp Corp.	787	
P. R. Mallory & Co.	678	
Mastra Co.		529
Mechanical Steel Tubing		634

Company	Booth	Room
Mellotone Inc.	121	
Metalworks Inc.	793	
Merit Coil & Transformer Corp.	322	
Microtran Co.	784	
Miratel Inc.	877	
James Millen Mfg. Co.	217	
J. W. Miller Co.	685	
M. A. Miller Mfg. Co.	315	
Minnesota Mining & Mfg. Co.	782	
National Carbon Co.	684	620
National Co.	204	
Newcastle Fabrics Corp.	870	
Newcomb Audio Products Co.		539A
North American Philips Co.		666
Oelrich Publications	672	
Ohmite Mfg. Co.	301	
Orradio Industries		536
Oxford Components		528A & 530A
Parker Metal Goods Co.	130	
Parts Jobber	13	
Peerless Products Industries	417	
Pentron Corp.		654A
Perma-Power Co.	411	
P & H Electronics		604
Philmore Manufacturing Co.		610-611
Pickering & Co.		512A
Pilot Radio Corp.		546A
Potter & Brumfield	309	
Precise Development Corp.	117	
Precision Apparatus Co.	589	
Precision Electronics	674	
Premier Metal Products Co.	135	
Pyramid Electric Co.	419	
Q-Line Mfg. Corp.		533
Quam-Nichols Co.	403	
Radiart Corp.	318	534A
Radio Corp. of America	576	521-522
Radio Merchandise Sales		657
Radio Receptor Co.	590	
Radio & Television Weekly		612
Radion Corp.		613-614
Ram Electronics		509
Rauland Corp.		785
Rauland-Borg Corp.		542A & 544A
Raypar	878	
Raytheon Mfg. Co.	591	
R-Columbia Products Co.	677	
Recordio		644A
Recoton Corp.	212	
Reeves Soundcraft Corp.		600
Rego Insulated Wire Co.	105	
Rek-O-Kut Co.		659A
Richards Electrocraft	687	
John F. Rider Publisher	302	
Robins Industries Corp.		657A
Rockbar Corp.		641A
Rogers Electronic Corp.	125	
Rohn Mfg. Co.	201	637
Ronette Sales Corp.		535A-536A
S & A Electronics	791	
Howard W. Sams & Co.	577	
Sangamo Electric Co.	686	516
Saxton Products	106	
Seco Mfg. Co.		651
Service Instruments Corp.	124	
Shell Electronic Mfg. Corp.	789	
Sherwood Electronic Labs.		664A
Shure Brothers		629A-631A
Simpson Electric Co.	103	534
Mark Simpson Mfg. Co.		601
Herman H. Smith	416	
Snyder Mfg. Co.	305	
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HEATHKIT

Manufacturer of the finest electronic equipment in kit form

A complete 12-watt hi-fi amplifier-preamplifier combination in one stylish unit . . . and at less than half the price you would expect to pay! Only

$28.95

BOOKSHELF 12-WATT AMPLIFIER KIT

An amplifier and preamplifier in one compact unit. The EA-2 has more than enough power for the average home hi-fi system and provides full range frequency response from 20 to 20,000 CPS within ±1 db, with less than 1% harmonic distortion at full 12 watt output over the entire audio range (20 to 20,000 CPS). IM distortion is less than 1.5% at 12 watts with low hum and noise. EL84 tubes are used in a push-pull tapped-screen output circuit. Inputs consist of crystal phono, tuner, and mag phono with RIAA equalization. Separate bass, treble and hum balance controls are featured. Taps provided for 4, 8 and 16 ohm speakers. Add this unit to your present system for simple stereo conversion. Complete instructions and pictorial diagrams show where every part goes and assures you of quick, easy assembly. Handsome vinyl clad steel cover measures 12½" W. x $8\frac{3}{16}$" D. x 4⅜" H. Neon pilot light on front. Shpg. Wt. 15 lbs.

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Send for this free catalog describing over 100 easy-to-build kits in hi-fi-test-marine and amateur radio fields.

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KESTER "RESIN-FIVE" FLUX-CORE SOLDER enjoys almost 100% acceptance by the radio-television-electronics service industry. Servicemen like its fast action and easy application . . . its non-corrosive, non-conductive activated flux does a perfect job every time.

Send for detailed information on Kester "Resin-Five" Flux-Core Solder.

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Since 1899 60th Anniversary KESTER SOLDER

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2. Transistor portable radios
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Improved D-612T . . . better than ever — same low price
- Dual range — 0-8 volts, 0-16 volts, continuously variable
- Up to 22½ volts available for transistor portable radio loads
- 1/10% AC ripple for low current loads — ½% AC ripple up to 5 amperes
- 10 amperes continuous duty up to 12 volts
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Send for New Bulletins giving data and applications

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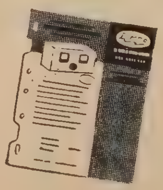
Canada: Atlas Radio Ltd., Toronto



Company	Booth	Room
Spaulding Products Co.	883	
Spirling Products Co.	592	
Spox Co.		625
Sprague Products Co.	574	
Standard Coil Products Co.	691	
Standard Electrical Products Co.	108	
Stephens Trusonic		556A-557A
Stevens Walden	675	
Stromberg-Carlson		515A & 517A
Superex Electronic Corp.		616
Switchcraft	420	
Sylvania Electric Products	676	560-561
Talk-A-Phone Co.	133	532A-533A
Tandberg of America		545A
Tape-Athon		620A
Sarkes Tarzian	109	
Tech-Master Corp.		553A
Technical Appliance Corp.	21	
Telectrosonic		646A
Telematic Industries	575	
Telex	203	
Tenatronics Ltd.		636
Tenna Mfg. Co.	23	628
Terado Co.	683	
Tevco Insulated Wire	120	
Texas Crystals	777	
Thordarson Meissner Mfg. Div.	407	
Tops Records		634A
Trans-Tel Corp.		616A
Triad Transformer Corp.	404	
Trimm	223	
Trio Mfg. Co.	876	
Tri-Phi-Inc.	884	
Triplett Electrical Instrument	304	
Tru-Ohm Products Div.	102	
Tung-Sol Electric	104	
Turner Co.	128	
TV Development Corp.	886	
Ultravision Mfg. Corp.	5	
Ungar Electric Tools	409	
United Catalog Publishers	205	537
United Transformer Corp.	572	
Universal Woodcrafters		619A
University Loudspeakers		519A-520A
U. S. Engineering Co.	25	
Utah Radio & Electronic Corp.	587	
Vaco Products Co.	321	
Vector Electronic Co.	6	
Vidaire Electronics Mfg. Corp.		658A
V-M Corp.	316	
Vocaline Company of America, Inc.		644
Waldom Electronics		502
P. Wall Mfg. Co.	571	
Walsco Electronics Mfg. Co.	579	
Ward Leonard Electric Co.	129	
Ward Products Corp.		602
Waterman Products Co.	879	
Waters Conley Co.		643A
Weathers Industries		666A
Webcor	113	640A
Webster Electric Co.	689	623A-624A
Wellcor		655A
Weller Electric Corp.	317	
Wen Products	208	
Westinghouse Electric Corp.	679	545-546
Weston Instruments Div.	414	
Winegard Co.	215	
Winston Electronics		633
Workman TV	101	
Worner Electronic Devices	882	
WYCO Metal Products	786	
Xcelite	225	
Ziff Davis Publishing Co.		632

Rider RADIO CODE COURSE

The 'Sound-N-Sight' radio code course, authored by Lewis Robins and Reed Harris, utilizes long playing records, flash cards and instruction book. Reinforced learning principles are applied throughout, so that a minimum of rote, or memory training, is required by the student. The course eliminates one of the most notorious barriers to achieving speed in Morse-code . . . the plateau. The student advances in steps of one word-per-minute per-day. The beginner is first taught three separate abilities: (1) Correct signal pattern perception (sound); (2) Identifying the letter for each signal pattern (sight); and (3) Associating sound patterns with letters (sound and sight). After each such response the instructor's voice on the record gives the correct answer. Runs are repeated until a passing score of 3 errors is achieved. Tests of the Sound-N-Sight system have shown that many people learn to receive 5 words-per-minute within 9½ hours of study. Complete Course covers all licenses up to commercial, 0 to 20 words-per-minute $15.95. Novice Course—0 to 8 words-per-minute $9.50, and Advanced Course—9 to 20 words-per-minute $8.95. John F. Rider Publisher, Inc., 116 West 14th St., New York 11, N. Y. (ELECTRONIC TECHNICIAN 5-49)

THE RIDER SOUND-n-SIGHT CODE COURSE

RCA VTVM

New light-weight "VoltOhmyst" (WV-77E) is the company's first test instrument offered in both kit form and factory wired. It measures ac from 0.1 to 1500 v., dc from 0.02 to 1500 v., peak-to-peak ac voltages from 0.2 to 4000, and resistance from 0.2 ohm to 1000 megohms. Additional features include: High input impedance; provision for zero-center indication, useful in discriminator and bias measurements; circuit design which allows measurements of ac in presence of dc, and vice versa; electronic protection against meter burn-out. RCA Electron Tube Div., Harrison, N. J. (ELECTRONIC TECHNICIAN 5-50)

For more information, write in ELECTRONIC TECHNICIAN'S new product code number on coupon, on page 58.

best buys in custom hi-fi... EICO®

- praised by the experts
- beautifully styled
- priced right for you
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FM Tuner HFT90
with precision "eye-tronic" tuning
Wired $65.95* Kit $39.95*
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*Less Cover, FET included
"One of the best buys you can get."—AUDIOCRAFT.

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STEREO Dual Amplifier-Preamplifier HF81
Wired $109.95 Kit $69.95
"Excellent"—SATURDAY REVIEW; and HI-FI MUSIC AT HOME.

STEREO Dual Preamplifier HF85
Wired $64.95 Kit $39.95

STEREO Dual Power Amplifier HF86
Wired $74.95 Kit $43.95

Omni-directional Speaker System HFS2
completely factory-built: 36" h, 15¼" w, 11½" d.
Mahogany or Walnut $139.95. Blonde $144.95
"Eminently musical"—HIGH FIDELITY
"Fine for stereo"—MODERN HI-FI

Also: **Bookshelf 2-Way Speaker System HFS1**
complete with factory-built cabinet, $39.95

Plus: POWER AMPLIFIERS (14, 22, 30, 35, 50 and 60-watts) from $23.50.
INTEGRATED AMPLIFIERS (12, 20, 32 and 50 watts) from $34.95.

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COLOR & Monochrome DC to 5 MC Lab & TV 5" Oscilloscope #460
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ADD 5% IN THE WEST

Now . . .
Planet offers you
exact replacement
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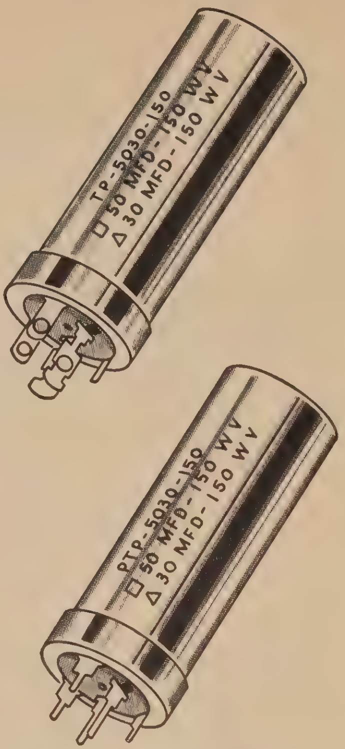
Solder Lug and
Printed Board
Construction



Planet Twist Prong Can Electrolytics are the choice of many top TV and electronic equipment makers. These firms use Planet "TP's" because of uniform quality, workmanlike construction and freedom from field troubles. Now Planet is making these same values and sizes available to you, the men who service this equipment. Ask for Planet "TP's" by name at your parts distributor.

We will send you our catalog listing upon request.

PLANET SALES CORPORATION
BLOOMFIELD, NEW JERSEY

No 60
QUALITY
J. W. MILLER COMPANY
INDUSTRIAL ELECTRONIC
RADIO AND TELEVISION R.F. COILS

3 new MILLER service aids
—yours for the asking

TV COIL REPLACEMENT GUIDE
New 88-page catalog cross-references thousands of original parts to Miller equivalents—all readily available at your distributor. Contains 300 new chassis listings. Most complete coverage of TV coils in the industry. Miller Catalog No. 160.

Complete AUTO RADIO COIL GUIDE
20 pages cross-referencing manufacturers' parts to Miller replacements. Lists every auto radio coil in use—each quickly identified. Miller Catalog No. 260.

New GENERAL CATALOG on transistor, TV and radio coils
Gives detailed data on 1300 standard coils—all available immediately. Complete new listing on color TV items. Miller Catalog No. 60.

Write for the above catalogs, or get them at your Miller distributor.

EXPORT REPRESENTATIVE:
Roburn Agencies, Inc., N.Y. 13, N.Y.

CANADIAN REPRESENTATIVE:
Atlas Radio Corp., Ltd., Toronto 19, Ont.

J.W. MILLER COMPANY
5917 S. Main St., Los Angeles 3, Calif.

ASSOCIATION

California

RTTA, Pasadena, announces new officers for 1959: Pres. Wayne Hartwell; 1st VP Barry Evans; 2nd VP Tom Suechika; Secy. Virgil Gaither; Treas. Shep Sheppard; Director Ben Leff; Director Mike Guitirrez.

RTA, San Gabriel Valley, elects Wayne Hartwell as president. RTA, Pasadena, installs Phil Elfenbein as new president.

RTA, Santa Clara Valley, installs new officers: Pres. Jack M. Morrisroe, VP Russell J. Hamm, Sec.-Treas. John C. Murphy.

Independent TV Service Dealers, Los Angeles, is pursuing a campaign with distributors and newspapers to cut jobber retail sales. The group is also circulating a petition to be sent to Congress and the FCC asking that the monopoly aspect of captive service be investigated.

Appliance Profession Assoc. is sponsoring a trade extension school program for appliance service technicians in San Francisco.

Florida

In accordance with a resolution passed at the NATESA Spring director's meeting, RTT Guild of Florida will change its name to TESA-Florida.

Illinois

NATESA announces new affiliates have joined the organization: Western Reserve Electronics Assoc., Warren, Ohio; Indianapolis TV Technicians Assoc.; East Central Tennessee TV Technicians Assoc.; and another new group in Kansas.

Electronic Service Guild, Franklin Park has contributed to the support of IDEA, reports Sec. Lyle Green.

ARTS is leasing exhibit space at the International Trade fair to be held in Chicago on the Navy Pier, July 3-18.

Indiana

ITTA, Indianapolis, reports that Senate Bill 149 to license TV service technicians and dealers has died in committee. Support for the measure, though not lacking, was slow in coming in. Opposition was slight

NEWS

Pennsylvania

TSA of Delaware Valley reminds technicians to attend the Electronic Service Industry meeting, June 12-14, at Philadelphia's Benjamin Franklin Hotel. Lectures and demonstrations will be featured. The group has also detailed its hospital, surgical and weekly income plan carried through Hardware Mutual Casualty.

Michigan

TSA of Michigan elects new officers: Pres. Patrick LaForet, Sec. Michael Graham and Treas. Isa Katuah. VP's are Lawrence Nelson, Lou Hudson, Thomas Goode, Calvin Longton and Charles March. Board members are Karl Heinzman, Edward Brown, Eugene Zecman and Alexander Weiss.

New York

Western New York Electronics Guild, Buffalo, installs: Pres. Fred DiTondo; VP Lester Marschall; Treas. Clarence Thielke; Secy. Elmore Bement; Sgt. at Arms James Archibald.

North Carolina

The North Carolina Federation of Electronic Assoc. reports that the education program operated through the Vocational Education Dept. of the school system is beginning to roll. For upgrading and accreditation, technicians are urged to take the exams to determine the courses needed. It was noted that this program is open only to full-time technicians. Part-timers should enroll in other courses run by the state.

Ohio

ARTSD, Columbus, urges members to donate $20 to the Television Education Welfare Fund to support the state licensing issue.

TESA, Cincinnati, asks members to write to their legislators in favor of License Bill 134, and to contribute financially to support it.

Pennsylvania

TSDA, Delaware County, elects new officers: Pres. William Jordon; VP Peter Rapagnanni; Treas. Harry Goodchild; Secy. Leon Skalish; Directors John Mathews, James Daugherty, Frank Bianco and William Boyd. *TSA News* comments editorially on the need for plugging sales tax loopholes whereby part-timers do not collect the tax required by law.

Washington

TSA, Seattle, reports that House Bill 179 for TV service licensing died in committee. The bill had as its framework the apprenticeship training program sponsored for a number of years by state and federal governments.

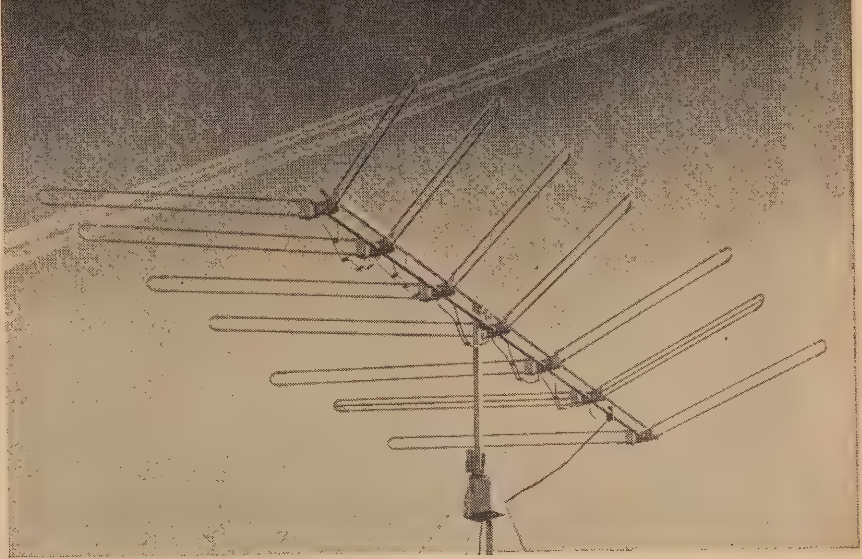
Texas

SARTA, San Antonio, says its campaign against back-yarders and illegal operators is not aimed at putting anyone *out* of business, but to put them *in* business properly.

Reminder: The Texas Electronics Assoc. Clinic & Fair will be held in San Antonio's Hilton Hotel, Aug. 7-9.

CHANNEL MASTER

Works Wonders in Sight and Sound



T-W... the King of the Hill!

Far-and-away the premium performer of all fringe area antennas is the Channel Master T-W. Dealers and servicemen, in overwhelming numbers, prefer this rugged powerhouse — for they know that when superior all-channel reception is needed, The T-W will respond with unequalled power.

Combining highest gains and highest front-to-back ratios with strongest mechanical construction, the T-W delivers the hottest performance of any TV antenna. That's why the T-W continues to be America's largest selling fringe antenna... and dollar for dollar, your best antenna buy.

CHANNEL MASTER CORP.
ELLENVILLE, N. Y.

The responsibility of being the finest...
A LIFETIME WARRANTY

FLUXVALVE AND T-GUARD ARE TRADEMARKS USED TO DENOTE THE QUALITY OF PICKERING & COMPANY INVENTIONS. 2373 C

Truly the finest stereo pickup ever made... the STANTON Stereo FLUXVALVE is hermetically sealed in lifetime polystyrene with all of the precision that has made Pickering a quality leader in the field of high fidelity for more than a dozen years.

For instance...only the STANTON Stereo FLUXVALVE has the "T-GUARD" stylus assembly—so safe and easy to handle...so obedient and responsive to every musical nuance in the stereo groove.

Only the STANTON Stereo FLUXVALVE has the parallel reproducing element contained in the "T-GUARD"...assuring the proper angle of correspondence between recording and playback styli for maximum **Vertical Tracking Accuracy.**

And...because of this the STANTON Stereo FLUXVALVE reproduces music with magnificent sound quality...from both stereophonic and monophonic records...with negligible wear on record and stylus.

In plain truth...the STANTON Stereo FLUXVALVE is by far the finest stereo pickup made...backed by a Lifetime Warranty*, assuring you a lifetime of uninterrupted, trouble-free performance—**with a quality of reproduction no other pickup can equal.**

We suggest you visit your Pickering Dealer soon —drop in and ask for a personal demonstration.

NEWLY REVISED—"IT TAKES TWO TO STEREO"— ADDRESS DEPT. M59 FOR YOUR FREE COPY.

*Excluding wear and tear of the diamond stylus tip and parts of the related moving system in the "T-GUARD" assembly.

"For those who can hear the difference" FINE QUALITY HIGH FIDELITY PRODUCTS BY
PICKERING & COMPANY, INC., Plainview, N. Y.

For the BEST in TV GUY WIRE ...look to WRIGHT

WRIGHT
NON-SNARLING GALVANIZED WIRE STRAND
G. F. WRIGHT STEEL & WIRE CO.

WRIGHT TV GUY WIRE has enjoyed wide-spread acceptance for more than 10 years.

WRIGHT TV GUY WIRE has bright, long-lasting galvanized finish.

WRIGHT TV GUY WIRE is packaged in 50 foot connected coils, in 1000 foot continuous lengths - non-snarling, too - both features introduced by us.

Four Strand – No. 20 • Six Strand – No. 20 • Six Strand – No. 18
No. 3 Cushion Center • Seven Strand – No. 18 Aluminum
All in 50 ft. connected coils – Also on metal and wood reels.

WHOLESALERS — Stocks near you — Worcester, Chicago, Atlanta, New Orleans, Dallas, Los Angeles, San Francisco and Portland, Ore. — prompt delivery, too!

G. F. WRIGHT STEEL & WIRE CO.
Worcester 3, Massachusetts

Magnetic Amplifiers

(Continued from page 35)

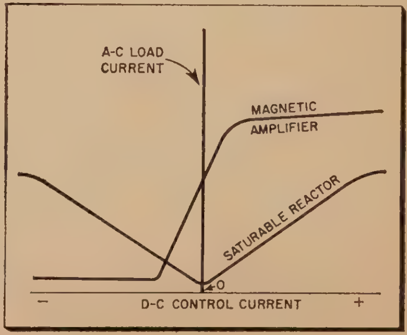
has been placed on the core. Its purpose is to control the amount of core saturation, which in turn controls the power delivered through the output winding to the load. Since the core flux is proportional to the ampere-turns, a large number of turns on the control winding and a small number of turns on the load winding permits a small control current to control a large output current. From the idealized curves in Fig. 5, it can be seen that the impedance of the saturable reactor is the same regardless of the polarity of the d-c control voltage. Here too the relative amount of impedance is indicated by the degree of slope.

If the polarity of the d-c control current is not changed, the direction of the core-saturating flux is not changed. Flux produced by an a-c control current changes its direction, and during each half-cycle tends to desaturate the core. If this effect is eliminated by removing the desaturating half-cycle, the change in control current required to produce a given change in output current is considerably less, and the amplification factor is increased.

Magnetic Amplifiers

Control of output power in a magnetic amplifier is accomplished by varying the impedance, and impedance is controlled by varying the degree of saturation. Keep in mind that a saturated core acts effectively as an air core, offering practically no impedance to the flow of a-c except the ohmic resistance of the

Fig. 5—The idealized curve of a saturable reactor shows that the impedance is the same regardless of polarity of the applied voltage.



coil windings; and an unsaturated core offers maximum impedance.

Fig. 6 illustrates this principle of magnetic amplifier operation. With the core completely within the winding, the impedance to the flow of current is maximum. Most of the supply voltage is developed across the reactor winding and a minimum value is developed across the load. When the core is removed from the winding, the impedance to the flow of current is minimum, and most of the supply voltage is developed across the load.

Since it requires relatively little power to move the core within the coil which may control several horsepower, this device is essentially a power amplifier. A magnetic amplifier may be described as a device which controls the reactance of a coil by controlling the effective permeability of the material upon which the coil is wound. There are many applications of magnetic amplifiers employing a mechanical system. Although the principle of control is similar, this mechanical action does not completely fulfill the definition of a magnetic amplifier because, instead of changing the effective permeability of the core material, the core is replaced by air.

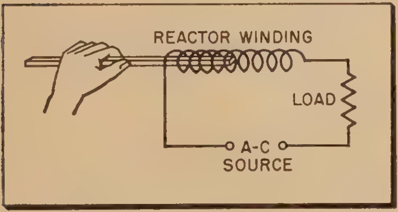


Fig. 6—Maximum impedance is obtained when the core is completely within the winding. Impedance falls off as the core is removed and allows more current to flow through the load. Power amplification is realized because a relatively small force can move the core, which in turn, can control several horsepower in the load.

All types of electronic devices have encroached upon the applications of electron tubes, and the magnetic amplifier is no exception. Tubes have done an admirable job in the past, and it isn't likely that they will be completely replaced by any device. However, there are many applications where tubes can't compete. The magnetic amplifier is extremely rugged and long lived, but it is more bulky, particularly at 60 cycles. As the frequency of operation increases, overall size decreases sharply. There are no heaters to warm up, so the unit is instantly available, but its response time is considerably longer. The magnetic amplifier may have an efficiency factor as high as 80% as compared to about 50% for a tube. There is less heat developed in the magnetic units, and they may be encapsulated or enclosed in small areas. They can produce high gain over a wide range of impedances, however, the frequency response is such as to confine their use, at present, to low frequency applications, and are not as yet suitable for audio amplifiers.

Experiments thus far have succeeded in raising the upper frequency limit to beyond 1 mc. In time, the cost-per-unit will drop, but at the moment prices of magnetic amplifiers are higher than the components they replace. Considering the relatively short time magnetic amplifiers have been with us; present widespread use; continued new research and development; and a growing list of new applications, it is evident that electronic technicians will have to add another item to their repertoire. •

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CHANNEL MASTER
electron tube

DEBUT...
of a Premium Performer!

Channel Master introduces a brand new line of PREMIUM QUALITY ELECTRON TUBES...bringing you the outstanding performance, quality, and value you've learned to expect from products that bear the brand of established excellence...Channel Master.

CHANNEL MASTER CORP.
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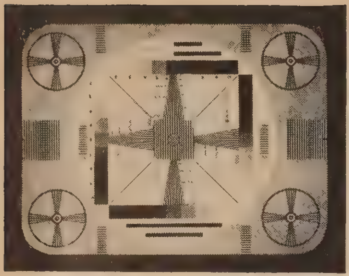


TV TIPS FROM TRIAD

NO. 3 IN A SERIES

We'll call you Joe.

As Outside Serviceman, you cured your share of sets by tube change and adjustment. But today you're Inside. The boss is sick, and a balky round-picture set must be out by five.

So you turn to Bill, the senior PTM down the street. The old trouble-shooter who's so willing to help a guy out with good advice.

YOU: "Bill, I've got this round picture chassis here. It's got parallel output tubes, and a switch to make the picture tall or short. I've replaced the flyback, but—"

BILL: "Don't tell me. It's running hot."

YOU: "You said it. And I used an 'exact' replacement, yet."

BILL: "Joe, sometimes I think that when a set gets that old, every condenser changes to a resistor—which adds up to heat. Which is what you have."

YOU: "I'll sure buy all that—but how do I get this job out today?"

BILL: "With me, it's the information that comes in the box with the new part that counts. Tell you what—I'll let you have the instruction sheet that came with my last D-45R from Triad, for the same job. It gives you lots of tests; tells how to control boost voltage, width coil and AFC loading, and even includes a Callback-Stopper Check Chart."

* * *

MORAL: A friend in need is a friend who knows about Triad, the brand that features *bonus* information. **Triad Transformer Corporation,** that division of Litton Industries which makes transformers the way transformers deserve to be made, also publishes Service Aids. PTM's say these are as good as textbooks. A card to 4055 Redwood Ave., Venice, Calif., will put you on the list—and bring your Callback-Stopper Check Chart.

SAVE TIME with SENCORE®

SENCORE

Handy "36"

R C-Substitution Unit

"36"—Most Often Needed Components at YOUR Fingertips!

3 Pole, 12 position switch individually selects one of the "36" components for direct substitution.

Contains:

★ 12—1 watt 10% resistors from 10 ohms to 5600 ohms

★ 12—½ watt 10% resistors from 10K ohms to 5.6 megohms

★ 10—600 volt capacitors from 100-mmfd. to .5 mfd.

★ 1—10 mfd., 450V Electrolytic ★ 1—40 mfd., 450V Electrolytic

★ For Shop, Lab, or outside service

ONLY

Model H-36 $12.95 DEALER NET

Completely Isolated

Available at all Parts Distributors

See other SENCORE ads in this issue.

Service Instruments Corp. 121 Official Road, Addison, Ill.

Stereo Conversion

(Continued from page 36)

installation work and enjoy a full mark-up on the kit itself. A number of distributors and dealers offer stereo conversion at a package price, which depends upon the type of phonograph to be converted and the kit selected to do the best job. This concept of course is not the ultimate in high fidelity, but it is an inexpensive approach to stereo and will enable the majority of monophonic listeners to enjoy the new stereo records without having to scrap their present record players.

Installation

Where the amplifier and speaker are contained in one cabinet, installation activities center around the record player. The stereo cartridge and its extra leads are mounted in the pick-up arm. The extra leads for the second channel are attached to a phono jack, which is also installed at this time. The new amplifier and speaker system are then plugged into this jack, and the system is complete.

Before attempting to convert a monophonic record player to stereo, the technician should appraise himself, and possibly his customer too, of several factors. If there is any defect in the existing equipment, such as hum, noise, distortion, etc., the conversion will not alleviate these conditions, and may very well aggravate them. Even if a conversion were not contemplated, eliminating these troubles is a valid and profitable service business activity.

Stereo cartridges usually have lower signal output levels than their monophonic relatives. With most record players, especially those that have two or more stages of amplification, this is no real problem, it usually means that the normal setting of the volume control will have to be advanced. One-tube amplifiers may not have sufficient gain. A quick check is to temporarily connect one side of the stereo cartridge to the existing amplifier, set a record in place, turn up the volume and listen. If the level is adequate, a conversion may be recommended. Another alternative and perhaps even more desirable is to install a new inexpensive but higher-gain amplifier in the record player. For optimum stereo results even in this low-priced approach it would be well to have the same type of amplifier in both channels. The manufacturer of kits may or may not wish to furnish extra amplifiers only. The local distributor should be able to supply this information.

The simple two-stage amplifier shown in Fig. 2 can handle the signal from a high ouput stereo cartridge. Most ceramic types have sufficient output for this purpose, and are already equalized for most modern records. Of particular interest is the power transformer. Aside from reducing the incidence of shock hazard, it eliminates the problems of tying two separate ac-dc chassis together at some common ground point. Hum problems have become more plentiful and from time-to-time have to be dealt with in all audio work, regardless of price or level of high fidelity achievement.

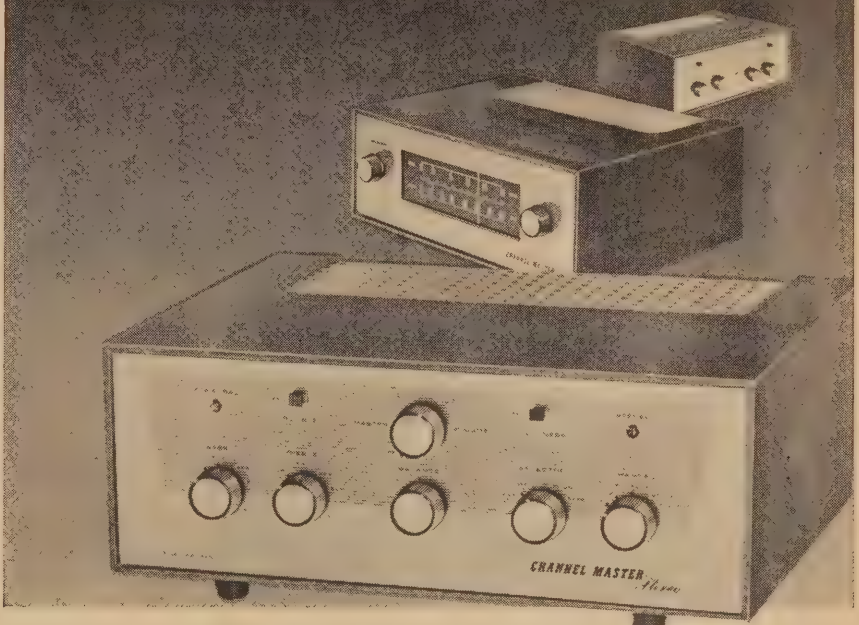
In the absence of the power transformer it may be necessary to use an isolation transformer to reduce hum and sometimes even to prevent component failure. A no-cost hum reduction technique is to try reversing the power-line plug of one or both amplifiers. Program material and noisy surroundings have a tendency to mask the hum level, therefore listen to the amplifiers in a quiet area and without any records playing. If necessary the hum level can be made more audible by advancing the bass and volume controls while experimenting with the line cord polarizing process. Most manufacturers, whether they sell the cartridge only or the complete conversion unit, provide installation instructions and other information with their products. Where unusual problems are encountered, their engineering departments are anxious to know about it. At the same time that they are helping a technician in the field, they may be obtaining important information which will help them improve their product. It is pretty much a two-way street.

Sales

Wherever one goes these days, the subject of stereo and hi-fi is apt to come up. It is sometimes difficult to keep from injecting a word or two into such a discussion even if the people are total strangers. One sure way to attract attention and capture this business, is to let the people know you have it, you sell it, you install it, and you service it. Folders, explaining stereo and conversion kits are available from manufacturers and distributors. They can be mailed to your customers or given away over the counter. They can be used to stimulate new prospects in a direct-mail campaign. There is a lot of business to be had. Window banners are sometimes available from the local distributor. Stereo conversion should be given a place in the regular advertising activities of the shop.

It is possible to work out of a hat, so to speak, and head for the distributor to pick up a unit as needed, but nothing will convince a customer, of what you can do for him, more than an actual demonstration. Experience has shown that with only one conversion on display and ready to be played, just by turning the on-off switch, the servicing technician can be in the booming stereo conversion business. ●

CHANNEL MASTER
Works Wonders in Sight and Sound



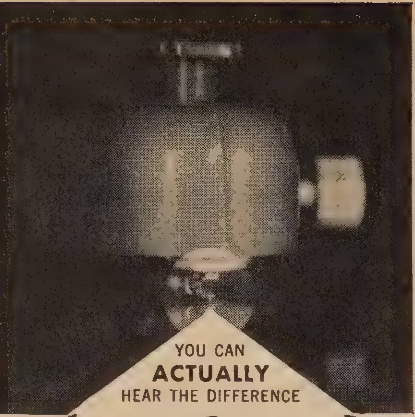
Love at First Sight . . . and Sound!

Channel Master ushers in a new era of superb sound with an exquisite line of stereo components. Years-ahead styling and advanced performance features make these new Channel Master high fidelity components outstanding values—at a price well within the reach of most consumers.

AMONG THE LEADING high fidelity manufacturers, only Channel Master protects the dealer by making its products available only through an authorized distributor. This safeguards you against unfair competition from mail order catalogues and cut-rate dealers, and permits you to sell these matchless instruments at an assured profit!

CHANNEL MASTER CORP.
ELLENVILLE, N. Y.

INSTALL THE NEEDLE THAT'S QUALITY MADE FOR HIGHEST QUALITY REPRODUCTION



YOU CAN
ACTUALLY
HEAR THE DIFFERENCE

Fidelitone new *N.C.S. oriented diamond

New Compatible Standard — reproduces both stereo and monaural recordings

Fidelitone N.C.S. Oriented Diamonds are precision manufactured to give your customers what they want — the finest in stereo and monaural reproduction.

Each Fidelitone N.C.S. Oriented Diamond is precision ground on Fidelitone-designed machinery to exact specifications. Then polished to a perfectly smooth ball point. Fits the microgroove exactly. Follows the intricate vertical and lateral sound impressions with maximum tracking accuracy. Increases response sensitivity at 10,000 cps, reduces distortion up to 45% at 5,000 cps. Old recordings reproduce with new-record fidelity. And a Fidelitone N.C.S. Oriented Diamond outlasts all other unoriented diamonds!

Fidelitone's superior quality is your best assurance of satisfied customers . . . customers that come back to you for all their hi-fi needs. Contact your Fidelitone distributor today.

See us at the Parts Show, suite 1404A at the Conrad Hilton.

Leader in fine needles for over 30 years.

Fidelitone

"Best buy on records"
Chicago 26, Illinois

Rogers TRANSFORMERS

A new TV flyback transformer, EFR 160, is an exact replacement for G.E. and Hotpoint part number RTO-214 and used in the "U2" line. Comes complete, packaged in a hermetically sealed plastic container. Rogers Electronic Corp., 49 Bleecker St., New York 12, N.Y. (ELECTRONIC TECHNICIAN 5-39)

Wharfedale SPEAKER SYSTEM

The Wharfedale WS/2 is a complete two-speaker system in a sealed enclosure. It will operate efficiently when driven by an amplifier of only moderate power. This unit, measuring only 11" x 10½" x 24", is finished on all sides and can be used singly or in pairs, horizontally or vertically . . . even on its back. It is a suitable "stereomate" for any high fidelity speaker. 20 to 20,000 cps. The WS/2 is $79.50 in sanded birch hardwood, ready-to-finish; $89.50 in birch hardwood finished in mahogany, walnut and blond; $94.50 in genuine walnut, natural oil finish. British Industries Corp., 80 Shore Rd., Port Washington, N.Y. (ELECTRONIC TECHNICIAN 5-33)

SO SAFE!

won't damage glass tubing

let alone wire or cable!

ARROW STAPLE GUNS can't damage wire or cable because driving blade automatically stops staple at right height! That's why Arrow Staple Guns are proved safer on jobs all over the country. And Arrow staples have tremendous holding power because they're rosin-coated, have diverging points that lock into wood.

T-25 (shown) for wires up to 1/4" in diameter. (Hi-Fi wire, radiant heating, bell, thermostat, telephone, inter-com, etc.) tapered striking edge gets into tight corners. Uses 3/8", 7/16", and 9/16" staples, List $15

T-25B For burglar alarm wiring. Drives staples flush . . . List $15

T-75 For non-metallic sheathed cable, Romex cable or any other object (such as copper tubing) up to 1/2" in diameter. Uses 9/16", 5/8", and 7/8" Arrow staples . . . . List $15

ARROW FASTENER COMPANY, INC.

Ah...
that's my driver!

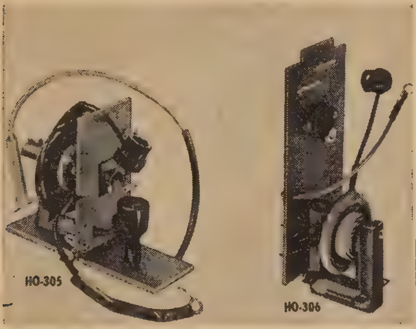
It's a VACO®

Service men all across the country agree . . . there's no other screw driver or nut driver with the built-in comfort of the VACO "comfordome" handle. Makes service work easy! Enjoy the luxury grip of a VACO . . . the driver that gives plenty of power, yet is always kind to hands. Next time choose a VACO and *feel the difference!*

Manufactured and Unconditionally Guaranteed by
VACO PRODUCTS CO., 317 E. Ontario St., Chicago 11, Ill.
In Canada: ATLAS RADIO CORP., Toronto 19, Ontario

Stancor FLYBACKS

Two new exact replacement flyback transformers are now available. HO-305 is an exact replacement for Crosley flybacks 159947-1 and 159947-2 used in 34 models and chassis. Flyback HO-306 is an exact replacement for Bendix parts TSOHO4, TSOHO5, 265051-1. It is used in 30 Bendix models and chassis. A complete list of the models and chassis using these transformers is given in Bulletin 554. Chicago Standard Transformer Corp., 3501 W. Addison W., Chicago 18, Ill. (ELECTRONIC TECHNICIAN 5-22)



Centralab SWITCHES

Five new exact replacement switches for auto radios are known as the SP group. They are used in Plymouth, Dodge, DeSoto, Chrysler, Ford, Mercury, Lincoln and Thunderbird radios. They complement the company's line of controls. Replacement applications for these five SP switches are dscribed in detail in Supplement 101 of the Auto Radio Control Replacement Guide. Copies are available free of charge. Centralab, 900 E. Keefe Ave., Milwaukee 1, Wis. (ELECTRONIC TECHNICIAN 5-19)

B & W DIP METER

A completely self-contained dip meter, Model 600, is equipped with color coded coils covering the frequency spectrum from 1.75 to 260 mc. The dip meter is useful in determining resonant frequency of tuned circuits, including traps, chokes, tank circuits and antennas. It also can be used as a signal generator and absorption wave meter for many applications. Barker & Williamson, Inc., Bristol, Pa. (ELECTRONIC TECHNICIAN 5-40)

Heath FM TUNER KIT →

Model FM-4 tuner kit offers better than 2.5 μv sensitivity, afc with defeat switch, flywheel tuning and prewired, prealigned tuning unit. A slight touch up of alignment can be made following simple instructions in manual if desired. Use of a ratio detector in conjunction with limiters assures good AM rejection. A multiplex output is provided for use with an adapter. The five-tube circuit utilizes a silicon diode rectifier. The styling is enhanced by the vinyl-clad steel cover with leather-like texture. Price is $34.95. Heath Co., Benton Harbor, Mich. (ELECTRONIC TECHNICIAN 5-35)

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Works Wonders
in Sight and Sound
CHANNEL MASTER
WORKS WONDERS IN SIGHT AND SOUND
TRANSISTOR RADIOS

POWERFUL... PROMOTABLE... and oh so PROFITABLE!

Put yourself in the profit picture with today's leading line of transistor radios. Channel Master offers you a superb array of powerful performers, including 5, 6, and 8 transistor models—priced, styled, and crafted to appeal to every prospect.

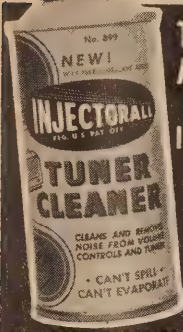
NOW! You can set up your own complete radio center! Channel Master's colorful new display is pilfer-proof—lets your customers see, touch, and play these outstanding radios—wraps up more sales than ever before. AND IT'S AVAILABLE AT NO CHARGE FROM YOUR CHANNEL MASTER DISTRIBUTOR.

CHANNEL MASTER CORP.
ELLENVILLE, N. Y.

See Mr. E. Wollman at the
AMBASSADOR EAST
May 17-18-19

INJECTORALL

THE NEEDLE DOES THE JOB!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NEW!
INJECTORALL
TUNER CLEANER
CLEANS AND REMOVES NOISE FROM VOLUME CONTROLS AND TUNER
CAN'T SPILL CAN'T EVAPORATE

TUNER CLEANER AND LUBRICANT with . . . INJECTOR NEEDLE

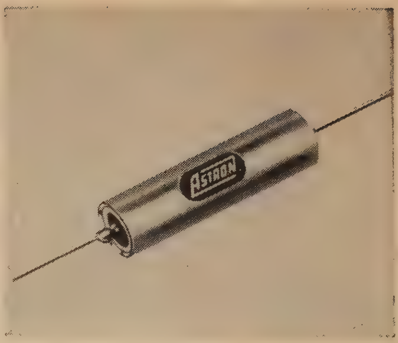
The leak-proof steel Injectorall Needle lubricates where you need it . . . you can reach hard-to-get at Wafers without pulling Tuners apart, or even removing Chassis.

The BEST CLEANER on the market today!

INJECTORALL CO. Brooklyn 14, New York

Astron CAPACITORS →

Type MQZF tubular axial-lead capacitors are hermetically sealed in metallized paper for low voltage transistorized applications. These 50 v subminiatures have a temperature range from —55°C to +85°C and feature high insulation resistance over the entire operating temperature range with low temperature coefficient of capacitance. Ratings are from 0.047 to 8.0 μf. Smallest size is 0.195" diameter and 11/16" long. Astron Corp., 255 Grand Ave., East Ave., East Newark, N.J. (ELECTRONIC TECHNICIAN 5-38)



Arco SILICON RECTIFIER →

Silicon rectifier, Part SR40, has been specifically designed for simple replacement in all radio and TV circuits. The quality of hermetic sealed "top-hat" military design has been carried over into the commercial field in order to provide long term trouble-free operation. The SR40 is rated at 400 piv, 500 ma. output current. All rectifiers are individually packaged in yellow and blue boxes. Arco Electronics, Inc., 64 White St., N.Y. 13, N.Y. (ELECTRONIC TECHNICIAN 5-21)

SR 40
500 MA
400 PIV
140 VRMS
ARCO ELECTRONICS, INC.
ARCO SR40

JFD Electronics

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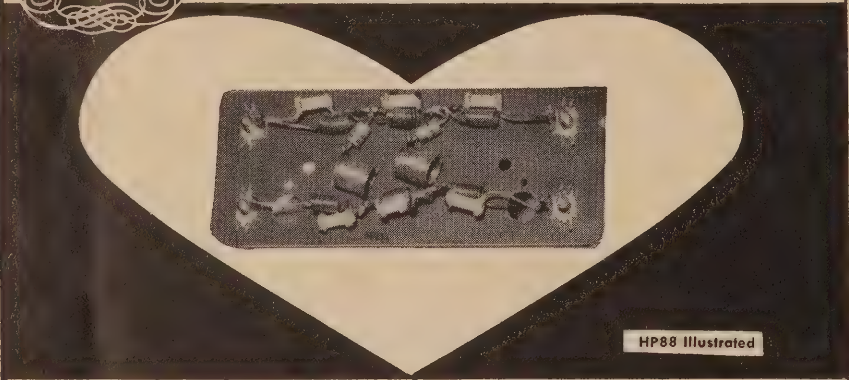

Take popular JFD TV Set Couplers for example. Ultra low-loss ferrite core transformers and bifilar coil design effect better inter-set isolation (12 db.), flat signal response, no increase in normal line SWR, insertion loss of less than 1 db across the band, optimum impedance match. Result: Maximum signal transfer across the band for crisp picture detail. Available in both outdoor and indoor types.

INDOOR TV SET COUPLERS

Housed in handsome molded non-breakable, high-impact styrene case for convenient out-of-sight installation.

model	description	list
BC2	Joins 2 sets	$2.85
BC3	Joins 3 sets	3.20
BC4	Joins 4 sets	3.60

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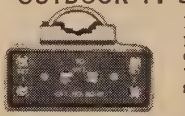
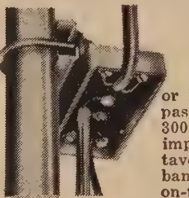
OUTDOOR TV SET COUPLERS



Encapsulated in waterproof weather proof col-plast. U-bolt provides quick, easy installation on mast.

model	description	list
AC40	Joins 2 sets to 1 antenna	$3.50
AC60	Joins 3 sets to 1 antenna	4.00
AC70	Joins 4 sets to 1 antenna	4.85

OUTDOOR ANTENNA COUPLERS



Combination of high pass and low pass filter networks gives 25 db or better isolation between bands, 2 db or less insertion loss flat pass-band characteristic, 300 ohm balanced image impedance. 6 db/per octave attenuation in stop band. U-bolt provides fast on-the-mast mounting.

model	channels	list
AC10	UHF-VHF	$3.50
AC20	VHF-UHF	3.75
AC30	LO-VHF–HI-VHF–UHF	4.85

INTERFERENCE ELIMINATORS

Knock out RF, FM and other TV interferences. Model HP50 features high-pass 3-section pi-type network, 18 db per octave attenuation below 50 mc., 0.5 db insertion loss in pass band, 300 ohm balanced image impedance. Model HP88 features 2-section band elimination filter, 12 db per octave attenuation in stop band, 0.5 db inserion loss in pass band, 300 ohm balanced image impedance.

model	description	list
HP50	Below 50 mc. interference	$4.50
HP88	FM interference	5.95

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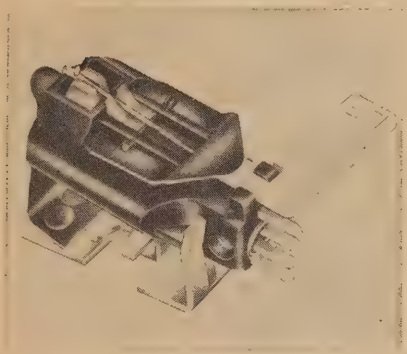
BROOKLYN 4, NEW YORK

JFD International
15 Moore Street
New York, New York

JFD Canada Ltd.
51 McCormack St.
Toronto, Ontario, Canada

Duotone STEREO CARTRIDGE

The British Acos "Hi-g" turnover cartridge is of the piezo-electric type with built-in RIAA equalization. Output is 0.8 to 1 v. Replacing the diamond-sapphire stylus costs approximately $6.00. Response is ±1.5 db from 40 to 15,000 cps with a roll-off of 10 db at 18 kc. It has a compliance of 4 x 10^{-6} cm/dyne with a tracking force of 2 to 4 grams. Channel separation is better than 25 db at 1 kc. The cartridge can be used for 3 or 4 terminal installations. Prices: GPS73-S/D, 0.7 mil diamond and 3 mil sapphire, $14.70; GPS 73-55, both sapphire, $8.70. Duotone Company, Keyport, N.J. (ELECTRONIC TECHNICIAN 5-27)



Channel Master RACK

A colorful display rack for transistor radios is available free of charge to dealers. This "pilferproof" display piece holds up to four of the company's radios, and takes up less than one square foot of space on a counter. A thin beaded chain secures each radio to the back of the display. This feature offers customers an opportunity to see, touch and play the radios, while preventing removal from the rack. Channel Master Corp., Ellenville, N.Y. (ELECTRONIC TECHNICIAN 5-13)

Blonder-Tongue FM AMPLIFIER

Model AB-FM broadband FM amplifier utilizes the low noise, high gain characteristics of the new 6ER5 frame-grid tube. Designed to improve reception on even the most sensitive FM tuners, the amplifier section may be mounted up to 600′ from the remote control unit near the receiver. Built-in multiplex circuits permit simultaneous transmission of ac and r-f on one 300 ohm line. It delivers 16 db uniform gain on all stations from 88-108 mc. Uses "No-Strip" terminals. Draws only five watts for economy of operation. Price is $53.95, the same as that of the companion Model AB-2, which is used for boosting signals on TV. Blonder-Tongue Labs., Inc., 9 Alling Street, Newark 2, N.J. (ELECTRONIC TECHNICIAN 5-34)

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***MODERN TRANSISTOR CIRCUITS.** *Edited by John M. Carroll. Published by McGraw-Hill Book Co., 268 pages, hard cover. $8.50.*

This collection of more than 100 articles from *Electronics* magazine contains some 200 schematics of specialized transistor circuits, in addition to many other waveform, curve and block diagram illustrations. These advanced technical articles cover specific equipment in the following categories: Amplifiers, Oscillators, Power Supplies, Pulse Circuits, Home Entertainment Circuits, Radio-TV Broadcast, R-F Communications, Audio, Test Instruments, Industrial Control & Instrument, Aircraft & Missile, Scientific & Medical, and Computers. For design and performance information, this is a very informative volume.

***FUNDAMENTALS OF HIGH FIDELITY.** *By Herman Burstein. Published by John F. Rider Publisher, Inc. 144 pages, soft cover. $2.95.*

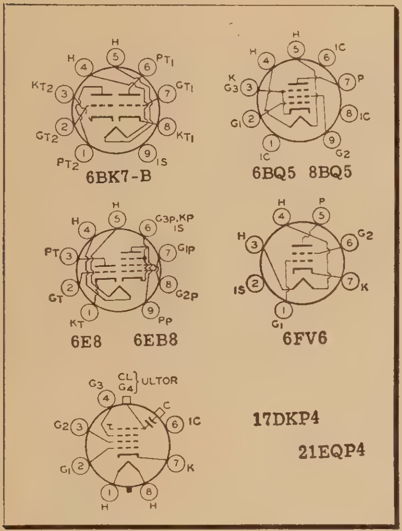
For the technician, one of the more appealing aspects of this book is the presentation of data in a manner which will help him educate an inquisitive customer. For example, there is a table of percentage allocation of the budget for various components. There are tables of performance ratings such as signal-to-noise, distortion, etc., which one should expect from hi-fi gear. Among other topics covered on an intermediate technical level are the playback system, program sources, loudness compensation, equalization and impedance. The text and illustrations are easy to understand.

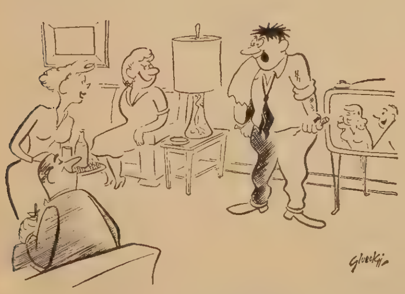
***RADIO ENGINEERING HANDBOOK.** *Edited by Keith Henney. Published by McGraw-Hill Book Co. 1800 pages, hard cover. $25.*

Here is the revised and up-to-date fifth edition of what is practically a technical encyclopedia of the electronic field. Each of the 28 chapters has been prepared by a leading engineer. Included are communications, RLC, waveguides, microwave tubes, semiconductors, speakers, measurements, amplifiers, oscillators, power supplies, transmitters, receivers, antennas, broadcasting, facsimile, code transmission, avionics, telegraphy and telephony. This extraordinary book is packed with circuits, curves, data tables, formulas and a host of highly technical explanations.

RCA TUBES

Seven receiving and two picture tubes are announced. The 6FV6 is a 7-pin sharp-cutoff tetrode for use as an r-f amplifier in vhf tuners. Transconductance is 8,000 micromhos. The 6EB8 and 8EB8 are 9-pin high-mu triode—sharp-cutoff pentodes for use in video-output amplifier, sync-separator, sync-clipper, and phase-inverter circuits of color and black-and-white TV receivers. Transconductance is 12,500 micromhos, plate dissipation 5 watts. The 6BQ5 and 8BQ5 are 9-pin miniature power pentodes intended for use in the audio-output stage of radio and TV receivers and phonos. Maximum-signal power output is 5.7 watts. The 5BK7-A and 6BK7-B are medium-mu 9-pin twin triodes for use in cathode-drive r-f amplifier circuits of tuners for vhf TV. In such circuits, one triode unit is used as the direct-coupled driver for the other unit. The new compact 110° picture tubes 17DKP4 and 21EQP4 are each nearly 2" shorter than the corresponding 110° types introduced about two years ago. The 17"-type 17DKP4 has a maximum overall length of 10 15/16"; the 21"-type 21EQP4, a maximum overall length of 12⅞". Neck length is only 3 9/16". The new short electron gun requires no ion-trap. Radio Corp. of America, Electron Tube Div., Harrison, N.J. (ELECTRONIC TECHNICIAN 5-36)





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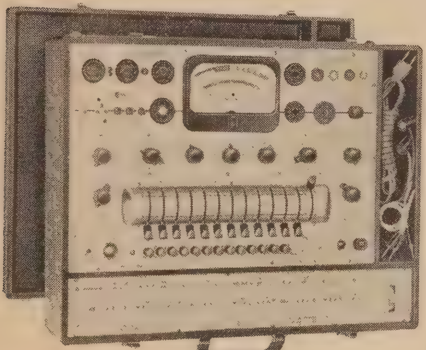

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Model S-3000 II FM Tuner featuring "Inter-Channel Hush." The new circuitry makes FM tuning easier by muting the noisy "hash" between channels. Control adjusts degree of silencing without affecting sensitivity. Specifications are: sensitivity, 0.95 µv for 20 db quieting; selectivity, 195 kc @—6 db; 20-20,000 cps ±½ db; distortion, less than ⅓% IM @ 100% mod.; hum & noise, 60 db below 100%. Sherwood Electronic Labs., Inc., 4300 N. California Ave., Chicago 18, Ill. (ELECTRONIC TECHNICIAN 5-24)

Scott TUNER →

Model 320 AM-FM tuner features wideband FM circuitry. A monophonic/multiplex switch allows conversion to multiplex. Slide-rule dial with separate logging scale simplifies selection of stations. An electronic eye indicator shows optimum tuning. FM sensitivity is 3 µv for 20 db of quieting on 300 ohm antenna terminals. Circuit features include a 2 mc wideband FM detector to assure high selectivity and capture ratio without afc. Price is $139.95. H. H. Scott, Inc., 111 Powdermill Rd., Maynard, Mass. (ELECTRONIC TECHNICIAN 5-25)

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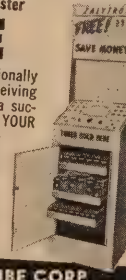
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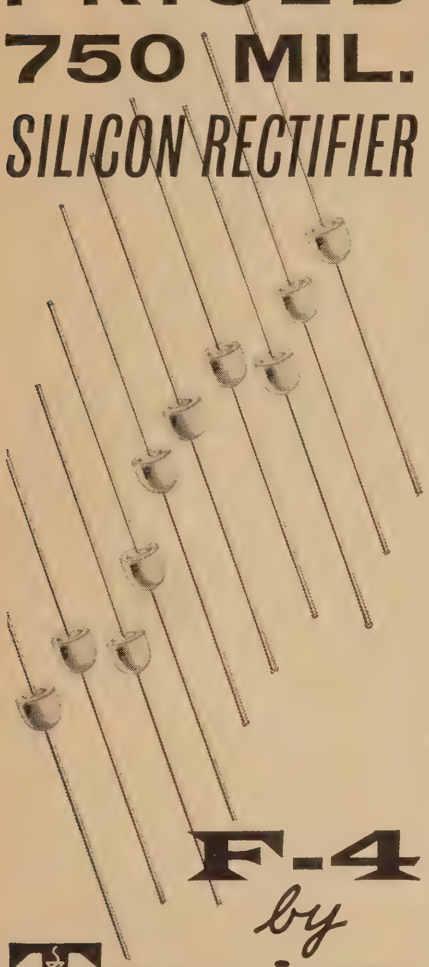
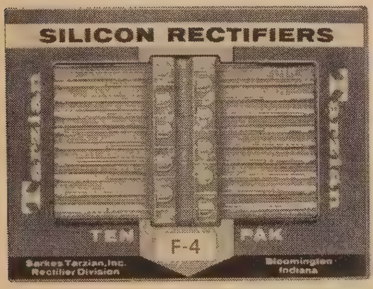


F-4
by
Tarzian



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Catalogs & Bulletins

(Continued from page 20)

RELAYS: A new 8-page illustrated folder features a wide assortment of relays, steppers, solenoids, contactors, rectifiers and related components. Universal Relay Corp., 42 White St., New York 13, N. Y. (ELECTRONIC TECHNICIAN B5-9)

RECEIVERS: A new 8-page illustrated, two-color catalog (RC-100) provides technical data, specifications and prices covering amateur and short wave receivers. National Co., 61 Sherman St., Malden 48, Mass. (ELECTRONIC TECHNICIAN B5-7)

ANTENNA: A preliminary catalog sheet describes the new 6 meter broadband "Ring" antenna, designed for fixed or base station use. Technical description, specifications and price are included. Hi-Par Products Co., Fitchburg, Mass. (ELECTRONIC TECHNICIAN B5-5)

CAPACITORS: Literature is available covering a new line of sub-miniature electrolytic capacitors, designed for miniaturized low-voltage transistorized circuitry. Standard stock sizes, temperature range, tolerance, maximum leakage, etc., are shown. Federal Electronics Sales Div., Fedtro Inc., Federal Electronics Bldg., Rockville Centre, N. Y. (ELECTRONIC TECHNICIAN B5-3)

Reps & Distributors

PEERLESS RADIO DISTRIBUTOR in New York appoints SAM EDELSTEIN sales manager.

DUTREX INDUSTRIES has been given the exclusive sales rights to ALLEN B. DU MONT renewal-type TV picture tubes.

EITEL-McCULLOUGH, INC. has named the JAMES S. HEATON CO. to represent them in northern Calif. and northern Nev.

KURMAN ELECTRIC CO. announces the appointment of the D. R. BITTAN CO. as rep for the metropolitan N.Y. and N.J. area.

CENTRAL ELECTRONIC DISTRIBUTORS, Englewood, N.J., is a merger of GREYLOCK ELECTRONICS SUPPLY CO. and BAY ELECTRONIC DISTRIBUTORS.

WALDOM ELECTRONICS has appointed the M. F. KLICPERA CO. for Tex., La., Okla., and Ark. and JERRY KIRSHBAUM Co. for metropolitan N.Y., Westchester County, L.I., and upper N.J.

STACKPOLE CARBON CO., Electronic Components Div., announced the appointment of EICHORN & MELCHOIR, INC. to represent them in the central and northern Calif. areas, and the BURT C. PORTER CO., northwestern states.

BOGEN
the sound way
to better stereo

IT'S TRUE WHAT THEY SAY ABOUT STEREO

Any stereo set-up—no matter what the cost—is only as good as the quality of the components that go into it. To put it another way, the quality you want can *only* be supplied by a company with the experience in sound engineering that the manufacture of superior stereo components requires.

Everyone agrees that the making of high-fidelity sound equipment is an extremely technical, highly specialized phase of the electronics industry. And that years of experience are required before a high degree of manufacturing excellence can be achieved. For over twenty-five years, Bogen has been making special sound systems of *proven* excellence for schools, theatres, offices and industrial plants—as well as hi-fi components.

Here is the business end of a typical Bogen school sound system.

Wherever professional sound quality is needed—you'll find Bogen, the sound equipment *made* by professionals. Best of all, the same sound quality that engineers and musicians insist on is yours to supply—and enjoy—with Bogen stereo high-fidelity components.

For an exciting experience, be sure to see the newest lineup of Bogen p.a. and hi-fi equipment at Rooms 524-A and 526-A, Conrad Hilton Hotel. BOGEN-PRESTO CO., Paramus, N. J.

A Division of the Siegler Corporation.

BOGEN
HIGH FIDELITY COMPONENTS
BP

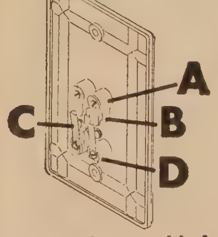
NEW *
TV/FM
with "Anti-Stub" Switch
ANTENNA OUTLETS

New Type FD-1PK MOSLEY TV & FM Outlet permits multiple antenna outlets to be wired in *tandem* without losses due to stub effect of unused line.

*When polarized plug is inserted, the silver-plated spring leaf switch opens the circuit beyond the outlet in use. Action is positive . . . fail-safe!

Type FD-1PK, complete with polarized plug and mounting brackets. List Price $2.20

Exclusive Features!



A. Strong one-piece molded construction!
B. Passive contacts lock in place!
C. Contacts are silver-plated . . . positive, corrosion proof!
D. Molded guide holds contacts parallel . . . prevents shorts!

Available at your favorite parts distributor.

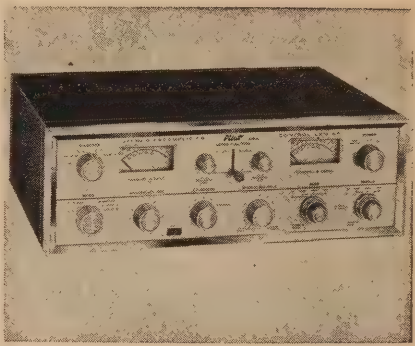
Mosley Electronics, Inc.
8622 ST. CHARLES ROCK ROAD
ST. LOUIS 14, MISSOURI

IRC RESISTOR CABINET →

The "Resist-O-Chest" is an all-metal file, smaller than a cigar box, containing up to 462 carbon compositions resistors arranged in "Handy-Paks." Metal separators in the chest keep each of the five columns of "Handy-Paks" in correct order. The "Resist-O-Chest" is a free premium. A choice of six different assortments is available at prices from $24.48 to $55.44. International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa. (ELECTRONIC TECHNICIAN 5-20)

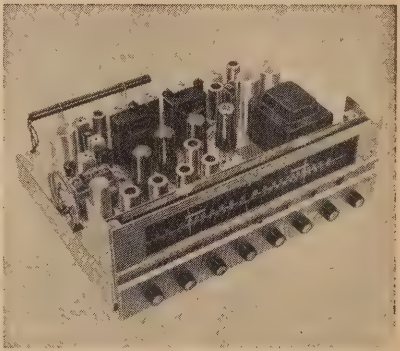
Pilot PREAMP →

The 216-A deluxe stereo preamp is a complete control center. Features include: 14 inputs; two illuminated VU meters; separate tape output controls; TroLoK tone controls; turntable/record changer switch; and automatic shut-off. Low output impedance permits audio cables up to 100′. Ratings are ±1 db from 20 to 20,000 cycles, output 1 v. Harmonic distortion is 0.2%. Hum and noise are 80 db below 1 volt. $199.50. Pilot Radio Corp., Long Island City, N.Y. (ELECTRONIC TECHNICIAN 5-26)



Harman-Kardon STEREO RECEIVER →

The Stereo Festival TA 230 contains a 15 watt/channel power amplifier (combined monophonic, 30 watts peak), dual preamps, provision for FM multiplex, and separate AM and FM tuners for simulcast reception. Features include: new friction-clutch tone controls which may be used singly or ganged; dc heated preamp filaments; speaker phasing switch; and four 7408 output tubes. Price is $259.95. Cabinet in metal, $12.95; wood $39.95. Harman-Kardon, Inc., 520 Main Street, Westbury, N.Y. (ELECTRONIC TECHNICIAN 5-23)



Save Time with SENCORE ®

SENCORE LEAKAGE CHECKER

Check these outstanding New Features

The LC3 provides all these new improved features in addition to those employed in earlier leakage or "grid circuit" testers. A must for any TV service technician.
★ Checks 156 different tube types—more than any other "grid cirucit" type checker. Includes UHF and latest type tubes.
★ Checks picture tubes without removing tube from cabinet or chassis.
★ New Roll Chart prevents obsolescence—just dial the tube type and save time. Chart is easily replaced at no extra cost.
★ Provides instant filament checks on "Fil-Check" position—no need to carry a second filament checker. ★ Capacitor checks simplified.
★ Two spare preheating sockets to cut down testing time.
In stock at your local parts distributor.

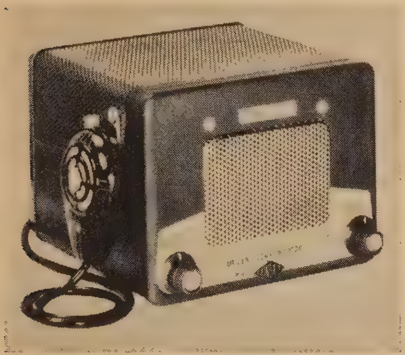
See other SENCORE ads in this issue

Model LC-3
$28.95
DEALER NET
Really Whips Tough Dogs

Service Instruments Corp. 121 Official Road, Addison, Ill.

Gonset 2-WAY RADIO

Citizens' Band 2-way radio G-11 is for use on the new 21 channel allocations within the 26.96 to 27.23 mc band. Licensing requires no technical examination, merely filing of a simple application form. Because of its lower frequency, this band is claimed to offer greater range and reliability than the existing 450-470 mc Citizens' Band. Transmitter provides 5 watts input, the maximum allowable power for this type of service. Frequency of both transmitter and receiver are controlled by quartz crystals. Gonset Div., Young Spring & Wire Corp., 801 S. Main St., Burbank, Calif. (ELECTRONIC TECHNICIAN 5-30)



Injectorall TUNER CLEANER

Chemical Tuner Cleaner is now made from a new formula incorporating a wax-free lubricant. Net price of $1.95 per 6-oz. can includes a detachable needle for directing a concentrated spray into hard-to-reach places. Needle comes packed in a plastic tube which provides a handy place for storing it in the tool kit. Injectorall Co., 2081 Shore Parkway, Brooklyn 14, N.Y. (ELECTRONIC TECHNICIAN 5-32)

No 890
NEW!
INJECTORALL
REG U S PAT OFF
TUNER
CLEANER
CLEANS AND REMOVES NOISE FROM VOLUME CONTROLS AND TUNERS
CAN'T SPILL
CAN'T EVAPORATE

Jersey Specialty LEAD-IN

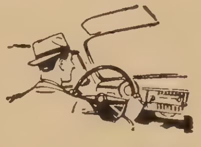
Atlas Supersonic TV lead-in wire is available in 100 mil, 450 wide; 120 mil, 450 wide; 150 mil, 450 wide; and 175 mil, 450 wide in brown and gold 41-41-82 strands full gauge copper. It's made with purest polyethylene for lowest loss. Jersey Specialty Co., Mountain View, N.J. (ELECTRONIC TECHNICIAN 5-15)

ALL-NEW

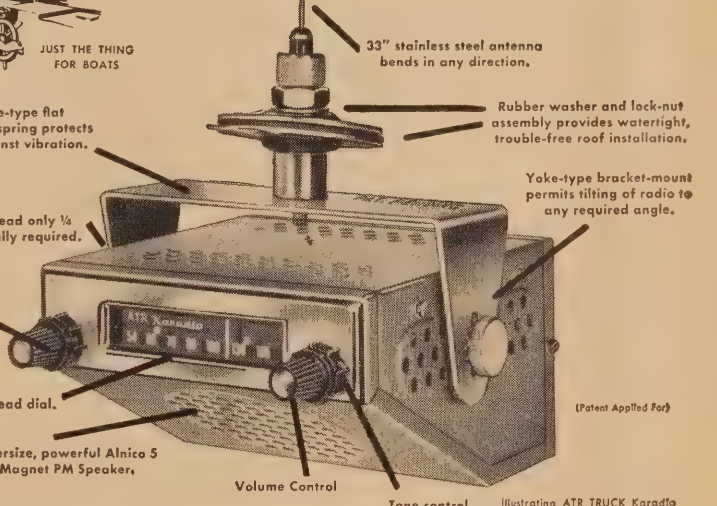
ATR TRUCK Karadio

for
- TRUCKS
- BOATS
- STATION WAGONS
- SMALL IMPORT CARS
- COMPACT U. S. CARS

PERFECT FOR TRUCKS


IDEAL FOR SMALL CARS

JUST THE THING FOR BOATS


33" stainless steel antenna bends in any direction.
Rubber washer and lock-nut assembly provides watertight, trouble-free roof installation.
Yoke-type flat bracket-spring protects set against vibration.
Yoke-type bracket-mount permits tilting of radio to any required angle.
Short antenna lead only ¼ the length normally required.
Finger-Tip Tuning Control
Large, easy-to read dial.
(Patent Applied For)
Oversize, powerful Alnico 5 Magnet PM Speaker.
Volume Control
Tone control

Illustrating ATR TRUCK Karadio Model TR 1279-12 Volt with Tone Control

The ATR Karadio is a new compact, self-contained airplane-style radio for trucks, boats, station wagons, small import cars, and compact American cars. This handy unit is perfect for trucks because it is easy and inexpensive to install in the cab roof—and its 6-tube radio with powerful 8-tube performance provides remarkable freedom from engine, static, and road noises. The ATR Karadio's single-unit construction (complete with speaker and optional antenna) is also ideal for boats where it can be roof-mounted. For small import and compact American cars, this economical unit can be easily installed in-dash or under-dash, as desired. Available for 6 or 12 volt battery system.

SEE YOUR JOBBER OR WRITE FACTORY

ATR AMERICAN TELEVISION & RADIO CO.
Quality Products Since 1931
ST. PAUL 1, MINNESOTA • U.S.A.

SIMPLIFY TEST and TROUBLE-SHOOTING PROCEDURES

with

KINGSTON
TEST EQUIPMENT

Models EA-1 and VS-5 Kingston Absorption Analyzers provide electrostatic signal tracing and extreme sensitivity. For trouble-shooting any equipment with wave forms. CRT displays wave-form from each stage.

Model PO-1 Kingston Absorption Analyzer allows conventional oscilloscopes to be used in trouble-shooting electrostatically. Built-in speaker for use as an audio analyzer.

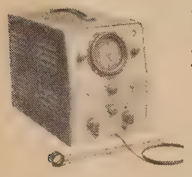
Accessory Probes for miniature, sub-miniature and shielded tubes. Also Direct Probe for use with VS-5 and EA-1. Transistor Radio Probe simplifies trouble-shooting of transistorized radios.

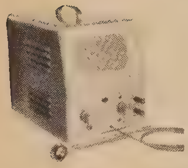
Model BB-1 Variable DC Source, battery-driven for use wherever a pure DC voltage is desired. Voltage can be varied and metered.

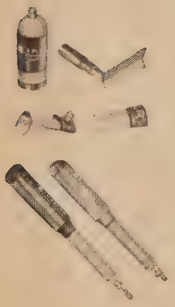
Probe-Master. Built-in capacitive network allows by-passing of stages, coupling of signals from one stage to another. Most versatile testing probe on the market. Complete with two clips and neon bulb.

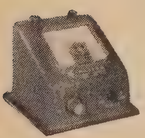
WRITE TODAY FOR CATALOG

KINGSTON
ELECTRONIC CORPORATION
MEDFIELD, MASSACHUSETTS, U. S. A.



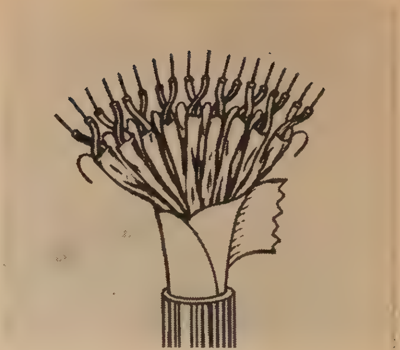






Belden CABLES →

Two multiconductor intercom cables are available with either 9 or 15 pairs of #22 AWG wires. These cables have individually shielded and completely isolated pairs. The shield is "Beldfoil" aluminum-mylar shield. By having each pair in the cable shielded, it eliminates noise and provides more dependable communications. No. 8764 (9 pairs) and 8766 (15 pairs) are available on 100, 500 and 1000-foot spools. Belden Mfg. Co., Chicago 80, Ill. (ELECTRONIC TECHNICIAN 5-9)



Triad TRANSFORMERS

Four new transformers in the TY series for transistor power suplies are epoxy molded. Operating from 12.6 v. dc supply, they are designated; TY-78, TY-79, TY-80, and TY-81 and are rated at: 250 v. @ 100 ma, 300 v. @ 200 ma, 325 v. @ 150 ma and 375 v. @ 200 ma respectively. Because of their toroidal configuration, they may be stacked on a mounting bolt with series parallel connections easily made. Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif. (ELECTRONIC TECHNICIAN 5-31)

Goodmans SPEAKERS

Two new Goodmans speaker systems include the Tetraxiom 4-way and the Triaxiom 3-way. The Tetraxioms are 15" 4-way speakers featuring the "Rigidflex" cone, a flexible, free-floating cone rim and rigid cone center. Response is from 20 to 20,000 cycles. There are four independent, concentrically placed radiators, each designed for maximum performance within its portion of the spectrum. The Tetraxiom Model 575 capacity of 50 watts, is $232.50. Model 355, 40 watts, is $196.50. The Triaxioms in 6 models from 25 to 50 watts, range in price from $69.50 to $147. Rockbar Corp., 650 Halstead Ave., Mamaroneck, N.Y. (ELECTRONIC TECHNICIAN 5-29)

REPLACEMENT SPEAKERS

Stick with the "man who brung" you . . . order replacement speakers and specify OXFORD . . . the world's largest producers of SPEAKERS. Our seven factories are supplying the majority of original equipment manufacturers, assures you of exact replacements.

Leading distributors carry OXFORD . . . so should you.

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COMPONENTS, INC.
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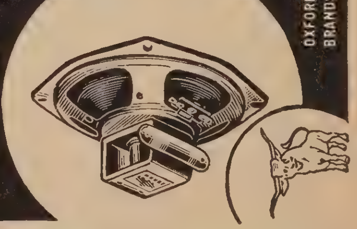
OXFORD BRANDS: Supreme Transformers, Hudson Lamps, Tempo Hi-Fi, Oxford Speakers & Rear Deck Kits.



SAVE TIME with SENCORE®

Transi-Pak

A "Twin" to the SENCORE TRC4 Transistor Checker

See other SENCORE ads in this issue.

A Low Cost
TRANSISTOR RADIO BATTERY ELIMINATOR

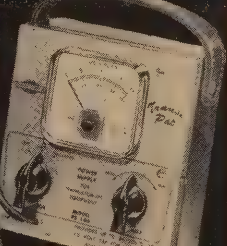
Here is a complete isolated power supply especially designed to replace batteries during repair time of all transistor radios.

★ Supplies up to 24V D.C
★ Provides 100ma constant and 200ma on peaks
★ Meter indicates either voltage or current
★ 1.5 volt biasing tap for Philco and Sylvania Transistor Radios

MODEL PS-103
$17.95
DEALER NET

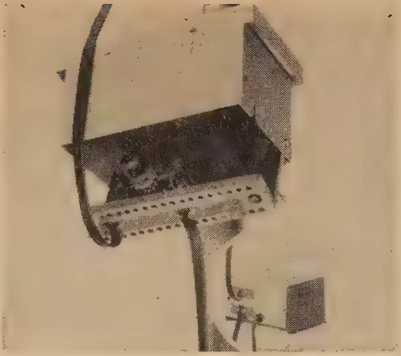
SERVICE Instruments Corp.
121 Official Road, Addison, Ill.

AT LEADING PARTS DISTRIBUTORS



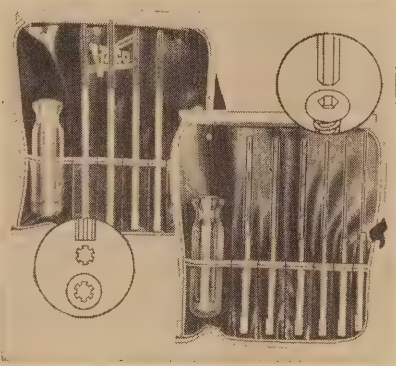
B-T ANTENNA BOOSTER →

Antenna-mounted booster, Model AB-2 broadband VHF-TV amplifier, improves picture and sound under weak-signal conditions. The 6DJ8 (frame-grid) tube is used in the pre-amp. Unit provides remote operation up to 600 feet from the TV receiver, "no-strip" terminal, multiplex circuits in the amplifier, and dual transmission of 24 v. ac power and r-f signals on one 300 ohm line. Price is $54.95. Blonder-Tongue Labs., 9 Alling St., Newark, N.J. (ELECTRONIC TECHNICIAN 5-10)



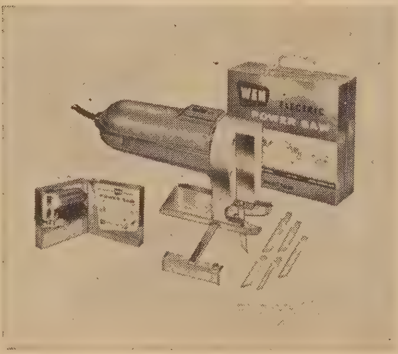
Vaco TOOL KITS →

Interchangeable blade tool kit for fluted spline or Bristol recess screws is designated as No. ZF40. It consists of one amberyl handle with clutch, plus four 6½" long interchangeable blades to fit screw sizes #5, #6, #8, #10-12. Also interchangeable "Allen" hex driver kit No. ZA-70 is offered. It consists of one amberyl handle with clutch, size 1" x 3⅝" and 6 hex bits. All pieces are held in plastic roll. Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill. (ELECTRONIC TECHNICIAN 5-12)



Wen POWER SAW KIT →

Model 505 universal power saw is now available in a handy, heavy gauge metal kit, with five assorted blades. Used as a rip saw, jig saw, cross cut saw, coping saw, scroll saw, hack saw and keyhole saw. It cuts a 2 x 4 in seconds, steel up to ½" thick, and makes its own starting hole and it cuts wood, plastics, metals, leather, hard rubber, composition board, formica, etc. Motor 115 v. ac/dc 1.8 amp rating. Load strokes per minute 2650. Length of stroke ⅝". $32.95. Wen Products, Inc., 5806 Northwest Hwy., Chicago 31, Ill. (ELECTRONIC TECHNICIAN 5-51)



MUTE

CLEANS BETTER • PROTECTS LONGER

THE ALL PURPOSE TUNER & VOLUME CONTROL TONIC PREFERRED BY TECHNICIANS EVERYWHERE

A HIGH QUALITY ALL PURPOSE CLEANER PLUS LONG LASTING PROTECTION

NON-INFLAMMABLE • NON-TOXIC • NO POWDER RESIDUE • NO CARBONTET

It can be used freely while set is in operation, by removing the tubes in any television tuner, inserted or sprayed directly through the tube sockets. Replace tubes, rotate tuner and you are amazed to find that reception, definition and lack of dirt intermittance is miraculously taking place before your eyes. No smells, no worry of detuning, no fire hazards and a guaranteed job without taking the tuner apart (that is if condition is due to dirt or oxidation). Stops profit stealing call backs.

Some areas open for representatives

ELECTRONIC SOLVENTS
170 North Park Street, East Orange, N. J.

6 oz. Spray Can
$1.95

Hi-Fi & Stereo experts demand Mullard

Britain's top quality audio tubes

EF86/6267
AF input pentode with exceptionally low noise, low hum, good microphony & high gain.

ECC83/12AX7
Specially constructed AF double triode with unique filament design for minimum hum levels as well as low microphony & low noise. Excellent replacement for 12AX7, 12AX7A & 7025.

EL84/6BQ5
Miniature AF power pentode. Particularly suited for compact stereo circuits providing up to 17 watts per channel in push-pull.

EL-37
AF output pentode requiring unusually low B+ voltage up to 60 watts per channel in push-pull circuitry replaces 6L6, KT66, 5881

EL34/6CA7
High sensitivity & exceptional linearity makes this EL-34 the finest high power output pentode. Its efficiency & low drive voltage requirements make it ideal for compact stereo circuits up to 100 watts per channel in push-pull.

ECL82/6BM8
AF triode & output pentode with unusual sensitivity. Specially designed for compact stereo equipment. Up to 9.8 watts per channel in push-pull circuits.

EZ81/6CA4
Miniature full wave cathode type rectifier with high voltage & with good regulation supplying up to 150 MA.

GZ34/5AR4
Bantam full-wave rectifier with 5 volt, 1.9 amp heater & 250MA output. Replaces 5U4G & 5U4GA without circuit changes plus additional advantage of better regulation & controlled warm-up time.

It is easy to understand why MULLARD circuits & MULLARD PREFERRED Audio Tubes are being used by the most important manufacturers of quality audio equipment throughout the world. Every single tube in this range has been specifically designed to meet the exacting requirements of high fidelity sound reproduction in every respect.

See that YOUR customers get the BEST by supplying them with world-famous MULLARD TUBES!

Other MULLARD PREFERRED types

DM70/1M3
EB91/6AL5
EABC80/6AK8
EBF89/6DC8
EC95/6ER5
ECC81/12AT7
ECC82/12AU7
ECC85/6AQ8
ECC88/6DJ8
ECC189/6ES8
ECF80/6BL8
ECF82/6U8
ECH81/6AJ8
EL86/6CW5
EM81/6DA5
EM84/6FG6
EZ80/6V4

Engineering application data for the NEW MULLARD STEREO CIRCUITS available on request.

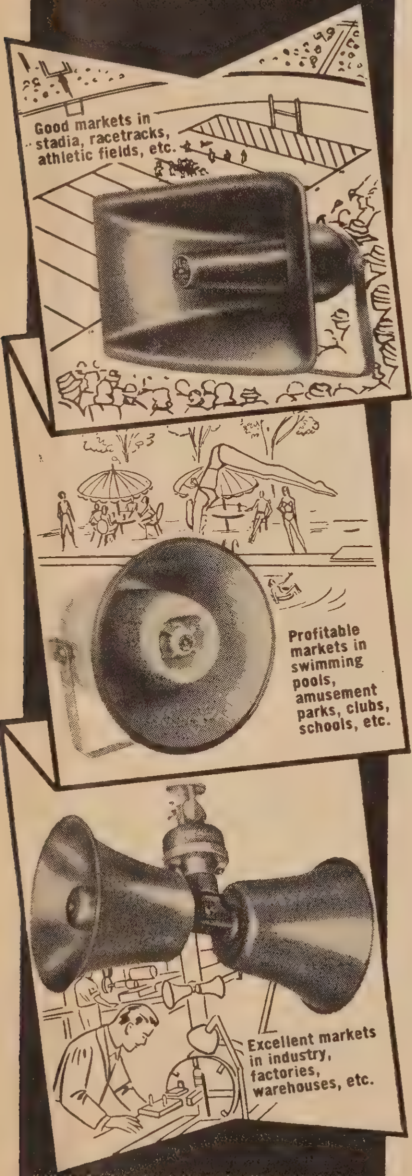
International Electronics CORP.
81 SPRING STREET
NEW YORK 12, N.Y.

Mullard

"Mullard" is the trademark of Mullard Ltd.

HOW TO
MAKE MONEY
Selling Commercial Sound

Here today and here tomorrow — Commercial Sound is a **steady-profit 12-months-a-year** business of sales, installation and servicing with lots of customers right in your own neighborhood.
Take advantage of the Atlas complete line of speakers — manufactured, advertised and supplied directly by Atlas . . .
Speakers for every application, a mike support for every purpose — plus a wide variety of accessories so necessary for a complete professional installation.


Good markets in stadia, racetracks, athletic fields, etc.
Profitable markets in swimming pools, amusement parks, clubs, schools, etc.
Excellent markets in industry, factories, warehouses, etc.

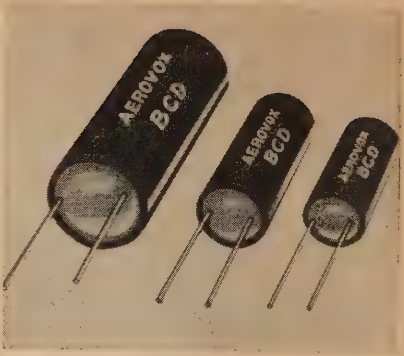
Write for latest catalog and selling aids to help you get profitable commercial sound business.

ATLAS
SOUND CORP.
Dept. ET 5
1449 — 39th St.
Brooklyn 18, N. Y.

In Canada: Atlas Radio Corp.
Toronto, Canada

Aerovox ELECTROLYTICS →

A new line of upright-mounting electrolytic capacitors, designated Type BCD, are particularly adaptable to mounting into printed-wiring boards, especially those used in car radios, personal portable radios, etc. A bakelite case and epoxy endfill provides an excellent barrier against moisture and leakage. One-inch minimum lead lengths enable easier threading of connections into printed wiring boards. Aerovox, New Bedford, Mass. (ELECTRONIC TECHNICIAN 5-17)



Alliance REMOTE CONTROL

A pocket radio transmitter which can actuate home appliances at the push of a button was designed initially as a portable radio control for electronic garage door operators. The entire unit fits in a solid leather case measuring 5⅝" by 2¼" by 1". Total weight is only 9 ounces, including 15 v. battery. Called the "Genie Model TT-5," the portable control unit eliminates car wiring and installation work. List price is $36.75. It will be sold as an accessory to "Genie" garage door operators. The Alliance Mfg. Co., Alliance, Ohio. (ELECTRONIC TECHNICIAN 5-42)

Jensen CARTRIDGE CABINET

Borrowing an idea from "tinker toy" construction, this modulator 11"x11"x3" steel case interlocks with other units to form a phono cartridge stock cabinet of any size desired. One of these combined steel cabinets requires only one cubic foot for every 100 cartridges. Convenient labeling system for each drawer. Each module can be added to as needed. Jensen Industries, 7333 W. Harrison St., Forest Park, Ill. (ELECTRONIC TECHNICIAN 5-28)

For more information, write in ELECTRONIC TECHNICIAN's new product code number on coupon, on page 58.

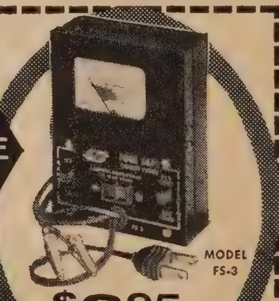
The Radio-Electronic MASTER
1536 Pages
5000 WATTS!
?

you'll find
the right TV service
items faster in the
'59 MASTER

Complete descriptions, illustrations, prices for more profitable TV-radio-audio-industrial servicing. You can buy, sell and bill direct from the MASTER —world's largest electronic catalog at your jobber . . . only **$3.50**. $4.50 in Canada

FREE – *24-page PANEL LAMP CHART at your jobber, or send 10c to:*

THE RADIO-ELECTRONIC MASTER
60T Madison Ave. • Hempstead, N.Y.



SENCORE
CIRCUIT
TESTER
"Fuse Safe"

Save Time with SENCORE

Save costly call backs by testing the circuit before replacing fuse, fuse resistor or circuit breaker.

Individual scale for each value fuse resistor—no interpretation, just read in red or green area.
★ Measures line current and up to 1100 watts of power at 115 volts using line cord and socket. ★ Two convenient current ranges— 0 to 2 amps and 0 to 10 amps. Test leads clip in place of fuse or fuse resistor. ★ 5 ohm, 10 watt resistor prevents TV circuit damage, simulates operating conditions.

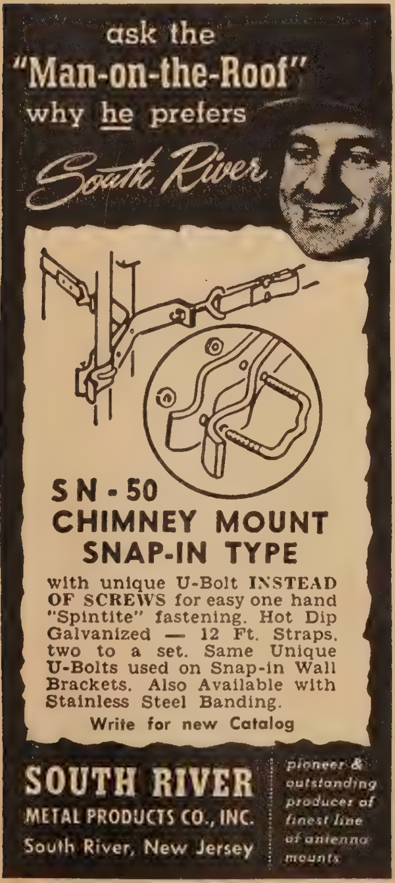
$8.95 DEALER NET
AC-DC or both as needed for Fuse Resistor Circuits

SENCORE ®

As Recommended by Leading Manufacturers
Service Instruments Corporation
121 Official Road, Addison, Illinois
See other SENCORE ads in this issue

Available at Parts Distributors

"Yeowie! *Here's* a whole chest full of *Jensen Cartridges!*"



ask the "Man-on-the-Roof" why he prefers South River

SN-50 CHIMNEY MOUNT SNAP-IN TYPE

with unique U-Bolt INSTEAD OF SCREWS for easy one hand "Spintite" fastening. Hot Dip Galvanized — 12 Ft. Straps, two to a set. Same Unique U-Bolts used on Snap-in Wall Brackets. Also Available with Stainless Steel Banding.

Write for new Catalog

SOUTH RIVER
METAL PRODUCTS CO., INC.
South River, New Jersey

pioneer & outstanding producer of finest line of antenna mounts

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An exclusive service by **Amperex®** *distributors:*

VALVO
RECEIVING TUBES
for replacement in European radios

Many European radios and hi-fi components now popular in this country utilize the European-made **VALVO** tubes, which have thus far had no American distribution. As a special service to the trade, **VALVO** tubes are now being stocked by all franchised Amperex distributors. Replacement of the original tubes with completely identical types will assure optimum results in the repair and servicing of these European sets.

ask Amperex
for the name and address of your nearest distributor

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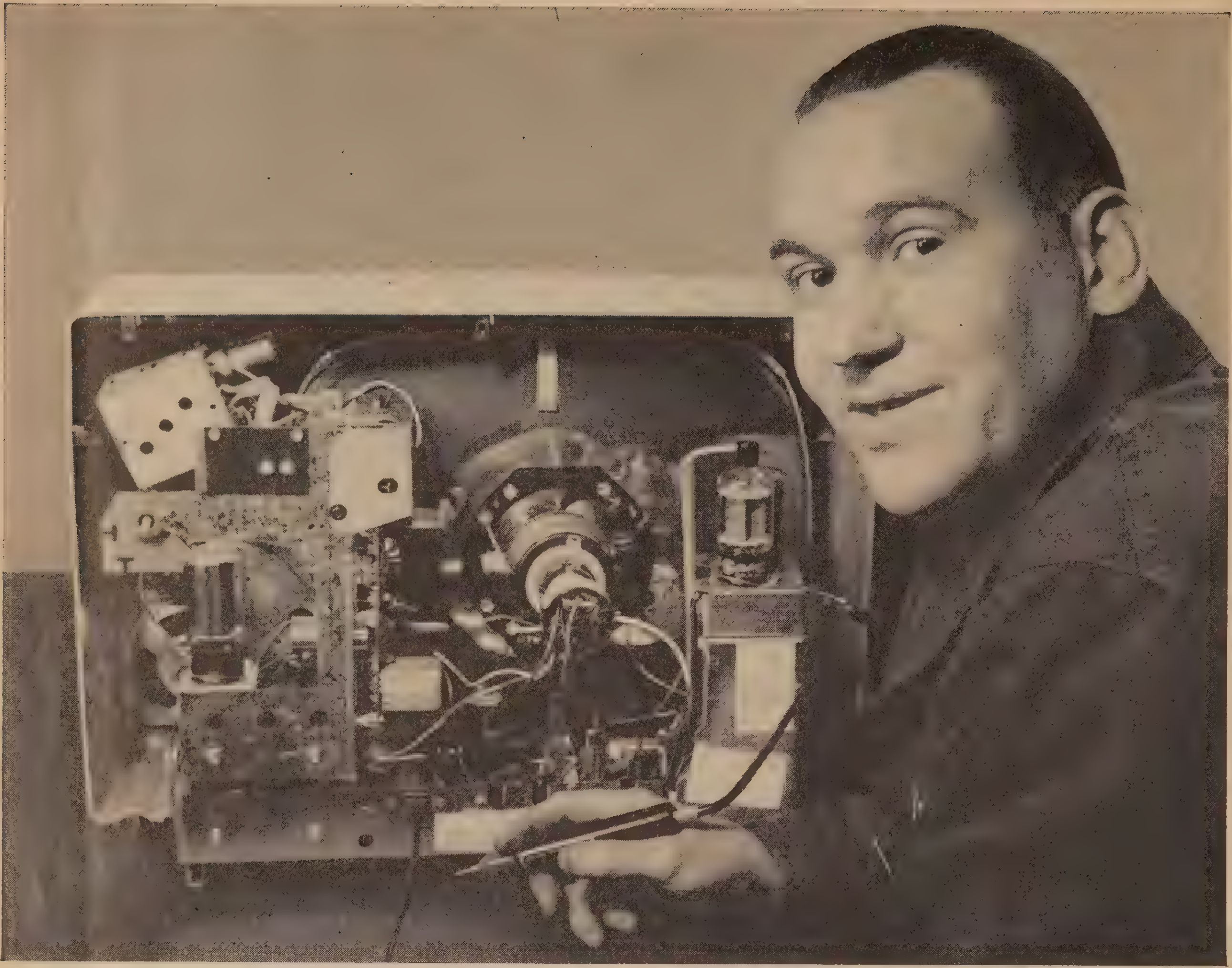


"IT'S A CINCH to get at the chassis in a G-E 'Designer'"

says CHARLES RODEN, Service Supervisor, Planet Service Corp., Richmond Hill, N. Y.

"Take the back off a General Electric 'Designer' TV receiver and it's a cinch to get at the chassis," says Service Supervisor Charles Roden of Planet Service Corp., Richmond Hill, N. Y.

"You almost never have to pull the chassis to circuit trace or replace parts and this means we can do 9 out of 10 repairs in the home. Customers like this—the bill is easier to take and their sets stay in service.

"Our higher home completion rate plus time saved by not having to pull the chassis mean we can make *more calls per man*, and *more money*.

"We like the way the 'Designer' is put together so that you can get at both sides of the printed boards while the *chassis is still in the cabinet*. Also, tubes are directly replaceable, fuses are accessible, and you can get at key check points. And the painted schematic on the boards helps us find our way around."

Precision Etched Circuitry is the name General Electric gives to its circuitry and it is used in all sets. This circuitry is reliable and *uniform* so that when you've serviced one you don't have to puzzle over the next one.

"Designer" TV—the easiest-to-service sets in television! General Electric Company, Television Receiver Department, Syracuse, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Special Full-Width SPRING BINDER Holds 24 Groups of ELECTRONIC TECHNICIAN'S CIRCUIT DIGESTS Available @ $2.95

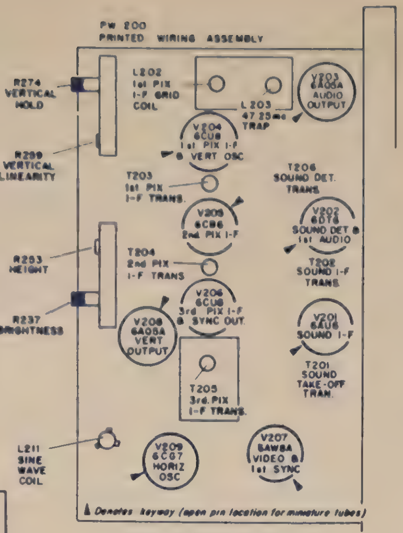
All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

*Measured with 1 megohm ½ watt resistor in series with meter probe.

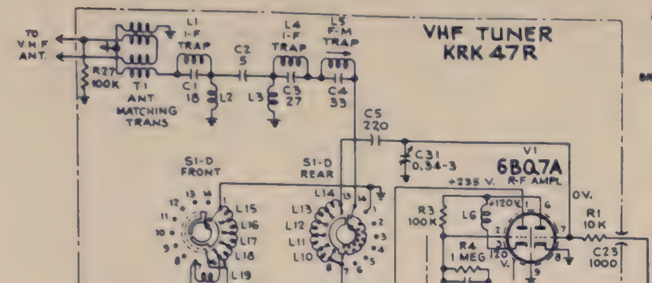
May • 1959

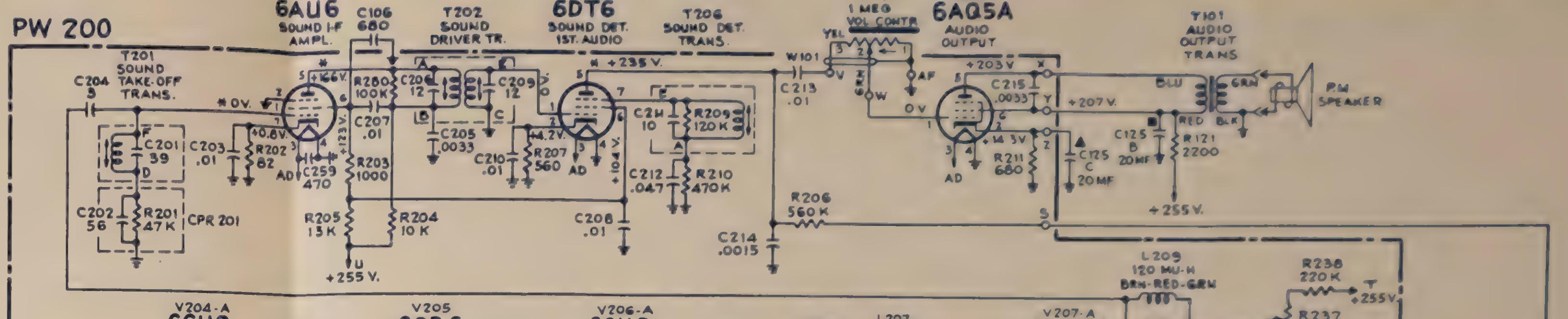
ELECTRONIC TECHNICIAN CIRCUIT DIGEST 496

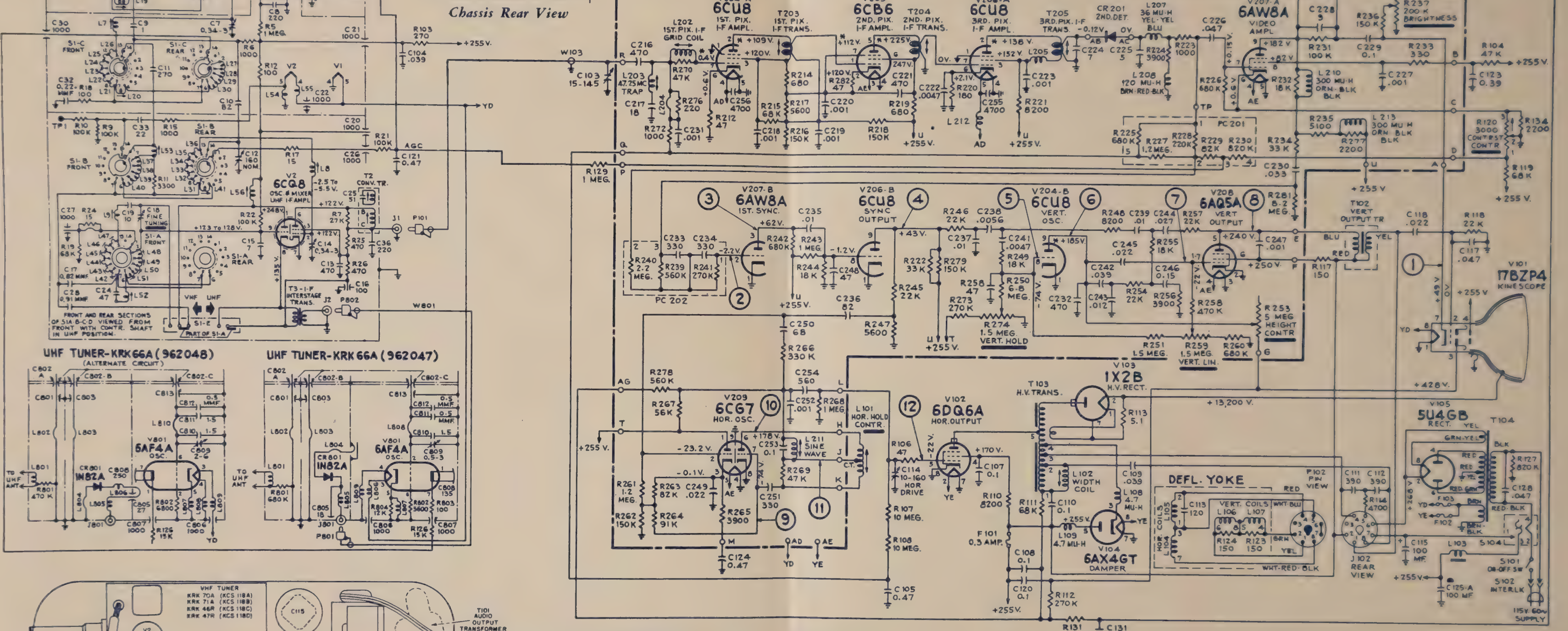
RCA
TV Chassis KCS118C, D

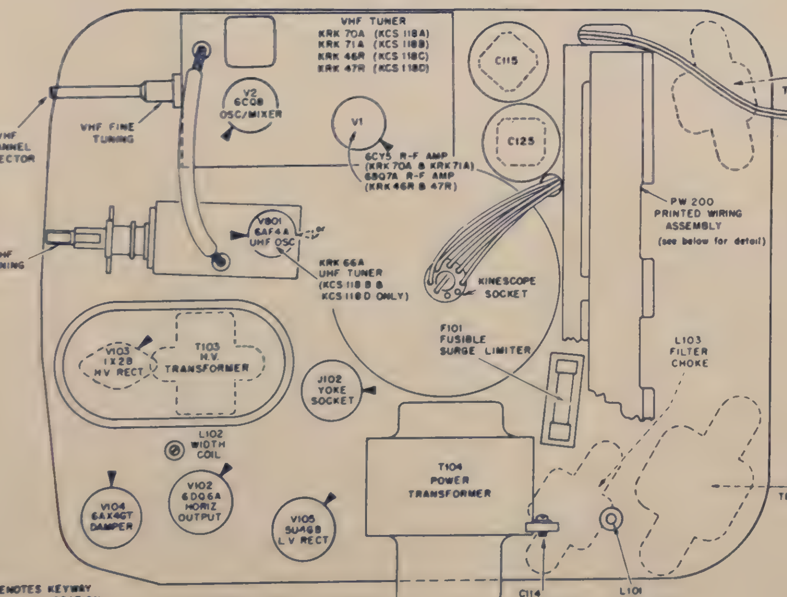

PW 200 PRINTED WIRING ASSEMBLY
R274 VERTICAL HOLD
R299 VERTICAL LINEARITY
R293 HEIGHT
R237 BRIGHTNESS
L202 1st PIX I-F GRID COIL
L203 47.25 MC TRAP
V204 6CU8 1st PIX I-F & VERT OSC
V203 6AQ5A AUDIO OUTPUT
T203 1st PIX I-F TRANS
T206 SOUND DET. TRANS.
V205 6CB6 2nd PIX I-F
V202 6DT6 SOUND DET. & 1st AUDIO
T204 2nd PIX I-F TRANS
V206 6CU8 3rd PIX I-F & SYNC OUT
T202 SOUND I-F TRANS
V208 6AQ5A VERT OUTPUT
V201 6AU6 SOUND I-F
T205 3rd PIX I-F TRANS
T201 SOUND TAKE-OFF TRAN.
L211 SINE WAVE COIL
V209 6CG7 HORIZ OSC
V207 6AW8A VIDEO & 1st SYNC
▲ Denotes keyway (open pin location for miniature tubes)

Chassis Rear View


TO VHF ANT.
VHF TUNER KRK 47R
T1 ANT MATCHING TRANS
L1 I-F TRAP
L4 I-F TRAP
L5 F.M. TRAP
S1-D FRONT
S1-D REAR
V1 6BQ7A R-F AMPL.
PW 200

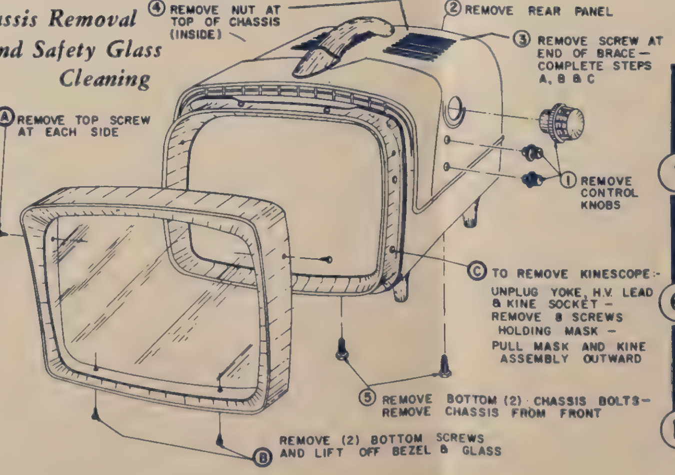

V201 6AU6 SOUND I-F AMPL.
T201 SOUND TAKE-OFF TRANS.
T202 SOUND DRIVER TR.
V202 6DT6 SOUND DET. 1ST. AUDIO
T206 SOUND DET. TRANS.
R125 1 MEG VOL. CONTR
V203 6AQ5A AUDIO OUTPUT
T101 AUDIO OUTPUT TRANS
PM SPEAKER
CPR 201
+255 V.


V204-A 6CU8 1ST. PIX. I-F AMPL.
T203 1ST. PIX. I-F TRANS.
V205 6CB6 2ND. PIX. I-F AMPL.
T204 2ND. PIX. I-F TRANS.
V206-A 6CU8 3RD. PIX. I-F AMPL.
T205 3RD. PIX. I-F TRANS
CR201 2ND. DET
L207 36 MU-H YEL-YEL BLU
V207-A 6AW8A VIDEO AMPL
L209 120 MU-H BRN-RED-GRN
R237 200 K BRIGHTNESS
R120 3000 CONTRAST CONTR
PC 201
V207-B 6AW8A 1ST. SYNC.
V206-B 6CU8 SYNC OUTPUT
V204-B 6CU8 VERT. OSC.
V208 6AQ5A VERT OUTPUT
T102 VERT OUTPUT TR
PC 202
R274 1.5 MEG VERT. HOLD
R259 1.5 MEG VERT. LIN.
R253 5 MEG HEIGHT CONTR
V101 17BZP4 KINESCOPE
VHF TUNER
UHF TUNER-KRK66A (962048) (ALTERNATE CIRCUIT)
UHF TUNER-KRK66A (962047)
V801 6AF4A OSC.
CR801 IN82A
TO UHF ANT
V2 6CG8 OSC & MIXER UHF I-F AMPL.
T2 CONV. TR.
T3 I-F INTERSTAGE TRANS.
FRONT AND REAR SECTIONS OF S1A-B-C-D VIEWED FROM FRONT WITH CONTR. SHAFT IN UHF POSITION.
V209 6CG7 HOR. OSC.
L211 SINE WAVE
L101 HOR. HOLD CONTR.
V102 6DQ6A HOR. OUTPUT
T103 H.V. TRANS.
V103 1X2B H.V. RECT.
+13,200 V.
L102 WIDTH COIL
L114 HOR DRIVE
V104 6AX4GT DAMPER
F101 0.3 AMP.
DEFL. YOKE
J102 REAR VIEW
V105 5U4GB RECT.
T104
S101 ON-OFF SW
S102 INTERLK
115V. 60~ SUPPLY
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫


VHF TUNER KRK 70A (KCS 118A) KRK 71A (KCS 118B) KRK 46R (KCS 118C) KRK 47R (KCS 118D)
C115
V2 6CG8 OSC/MIXER
V1 6CY5 R-F AMP (KRK 70A & KRK71A) 6BQ7A R-F AMP (KRK 46R & 47R)
C125
T101 AUDIO OUTPUT TRANSFORMER
VHF CHANNEL SELECTOR
VHF FINE TUNING
UHF TUNING
V801 6AF4A UHF OSC
KRK 66A UHF TUNER (KCS118B & KCS118D ONLY)
PW 200 PRINTED WIRING ASSEMBLY (see below for detail)
SPEAKER LEADS
KINESCOPE SOCKET
F101 FUSIBLE SURGE LIMITER
V103 1X2B HV RECT.
T103 H.V. TRANSFORMER
J102 YOKE SOCKET
L103 FILTER CHOKE
L102 WIDTH COIL
T104 POWER TRANSFORMER
T102 VERTICAL OUTPUT TRANSFORMER
V104 6AX4GT DAMPER
V102 6DQ6A HORIZ OUTPUT
V105 5U4GB L.V. RECT
C114 HORIZ DRIVE TRIMMER
L101 HORIZ HOLD CONTROL
▲DENOTES KEYWAY (OPEN PIN LOCATION FOR MINIATURE TUBES)

CHASSIS REAR VIEW

Chassis Removal and Safety Glass Cleaning



④ REMOVE NUT AT TOP OF CHASSIS (INSIDE)

② REMOVE REAR PANEL

③ REMOVE SCREW AT END OF BRACE — COMPLETE STEPS A, B & C

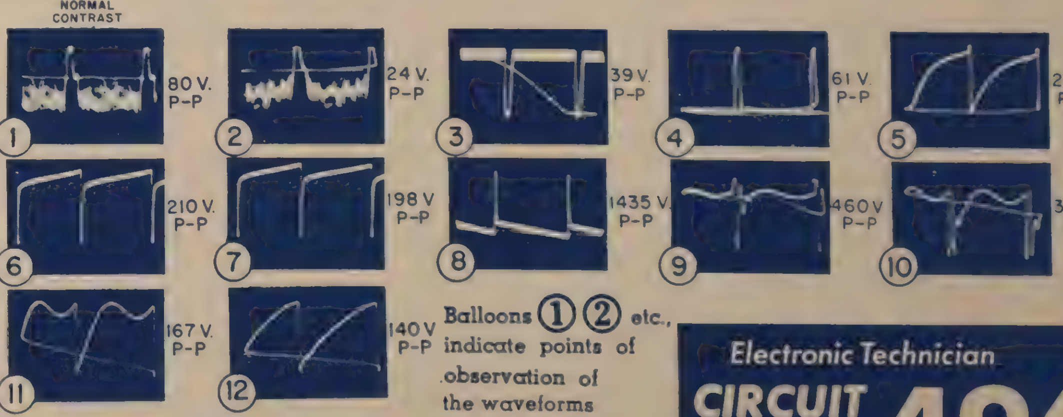
Ⓐ REMOVE TOP SCREW AT EACH SIDE

① REMOVE CONTROL KNOBS

Ⓒ TO REMOVE KINESCOPE - UNPLUG YOKE, H.V. LEAD & KINE SOCKET — REMOVE 8 SCREWS HOLDING MASK — PULL MASK AND KINE ASSEMBLY OUTWARD

⑤ REMOVE BOTTOM (2) CHASSIS BOLTS — REMOVE CHASSIS FROM FRONT

Ⓑ REMOVE (2) BOTTOM SCREWS AND LIFT OFF BEZEL & GLASS



Balloons ① ② etc., indicate points of observation of the waveforms on schematic.

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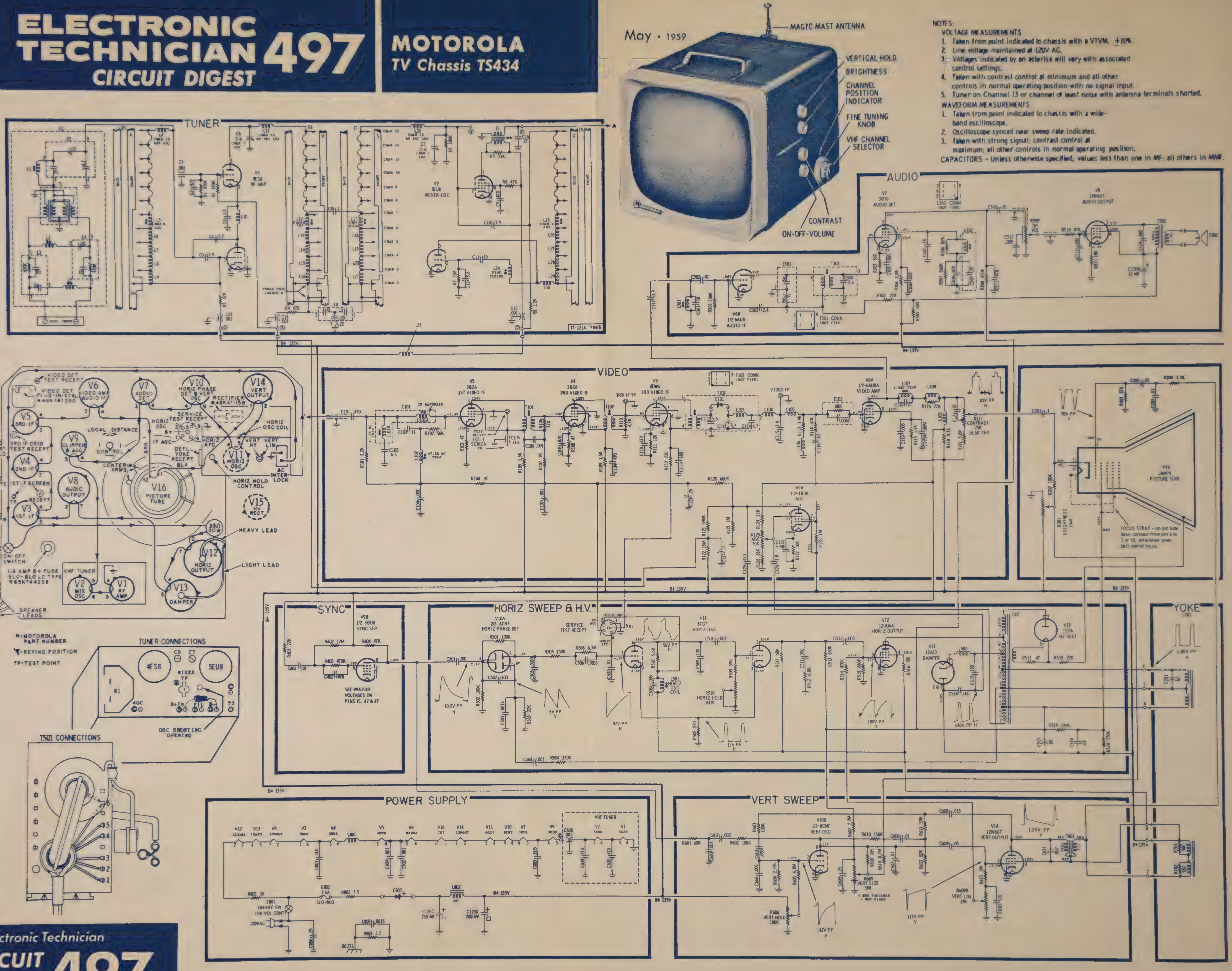
ELECTRONIC TECHNICIAN CIRCUIT DIGEST 497

# MOTOROLA
TV Chassis TS434

May • 1959


MAGIC MAST ANTENNA
VERTICAL HOLD
BRIGHTNESS
CHANNEL POSITION INDICATOR
FINE TUNING KNOB
VHF CHANNEL SELECTOR
CONTRAST
ON-OFF-VOLUME
TUNER
V1 4ES8 RF AMP
V2 5EU8 MIXER-OSC
TT-121A TUNER
AUDIO
V7 3DT6 AUDIO DET
V8 12W6GT AUDIO OUTPUT
V6B 1/2 6AU8 AUDIO IF
VIDEO
V3 3BZ6 1ST VIDEO IF
V4 3BZ6 2ND VIDEO IF
V5 4EW6 3RD VIDEO IF
V6A 1/2-6AU8A VIDEO AMP
V9A 1/2-3BU8 AGC
V16 14WP4 PICTURE TUBE
FOCUS STRAP - on pix tube base; connect from pin 6 to 1 or 10, whichever gives best overall focus.
R117 CONTRAST
R301 BRIGHTNESS
SYNC
V9B 1/2 3BU8 SYNC SEP
SEE V9A FOR VOLTAGES ON PINS #1, #2 & #7
HORIZ SWEEP & H.V.
V10A 2/3 6CN7 HORIZ PHASE DET
SERVICE TEST RECEPT
V11 6CG7 HORIZ OSC
V12 12DQ6A HORIZ OUTPUT
V13 12AF3 DAMPER
V15 1S2A HV RECT
L501 HORIZ OSC COIL
R510 HORIZ HOLD
YOKE
POWER SUPPLY
VHF TUNER
ON-OFF SW (ON VOL CONT)
120VAC
SLO-BLO
VERT SWEEP
V10B 1/3-6CN7 VERT OSC
V14 12W6GT VERT OUTPUT
R609 VERT SIZE
R606 VERT HOLD
R609B VERT LIN
B+ 135V
VIDEO DET TEST RECEPT
VIDEO DET PLUG-IN-XTAL *48K747380
V6 VIDEO AMP AUDIO IF
V7 AUDIO DET
V10 HORIZ PHASE DET & VERT OSC
V14 VERT OUTPUT
RECTIFIER *48K471158
V5 3RD IF
SERVICE TEST RECEPT
HORIZ OSC COIL
LOCAL DISTANCE CONTROL
HORIZ OSC
IF AGC
HORIZ AFC
V9 CLIPPER & AGC
3RD IF GRID TEST RECEPT
VERT HOLD
DEFL YOKE RECEPT
VERT HT
VERT LIN
V11 HORIZ OSC
AC INTERLOCK
V4 2ND IF
CENTERING ARMS
V16 PICTURE TUBE
HORIZ HOLD CONTROL
BRITE
1ST IF SCREEN RECEPT
TP
V8 AUDIO OUTPUT
V15 HV RECT
V3 1ST IF
CONTR
35Ω 20W
HEAVY LEAD
ON OFF VOL
ON-OFF SWITCH
V12 HORIZ OUTPUT
1.6 AMP B+ FUSE SLO-BLO LC TYPE *65K744238
VHF TUNER
V2 MIX OSC
V1 RF AMP
LIGHT LEAD
V13 DAMPER
SPEAKER LEADS
TUNER CONNECTIONS
C6
C7
4ES8
5EU8
E1
MIXER TP
AGC
B+IN
FIL
B+
T2
OSC SHORTING OPENING
T501 CONNECTIONS

NOTES:

VOLTAGE MEASUREMENTS
1. Taken from point indicated to chassis with a VTVM. ±10%.
2. Line voltage maintained at 120V AC.
3. Voltages indicated by an asterisk will vary with associated control settings.
4. Taken with contrast control at minimum and all other controls in normal operating position with no signal input.
5. Tuner on Channel 13 or channel of least noise with antenna terminals shorted.

WAVEFORM MEASUREMENTS
1. Taken from point indicated to chassis with a wide-band oscilloscope.
2. Oscilloscope synced near sweep rate indicated.
3. Taken with strong signal; contrast control at maximum; all other controls in normal operating position.

CAPACITORS - Unless otherwise specified, values less than one in MF; all others in MMF.

*=MOTOROLA PART NUMBER
Y=KEYING POSITION
TP=TEST POINT

Electronic Technician
CIRCUIT DIGEST 497

An Editorial Service of ELECTRONIC TECHNICIAN, INC. ☆ 480 Lexington Ave., New York 17, N.Y.

ELECTRONIC TECHNICIAN CIRCUIT DIGEST 498

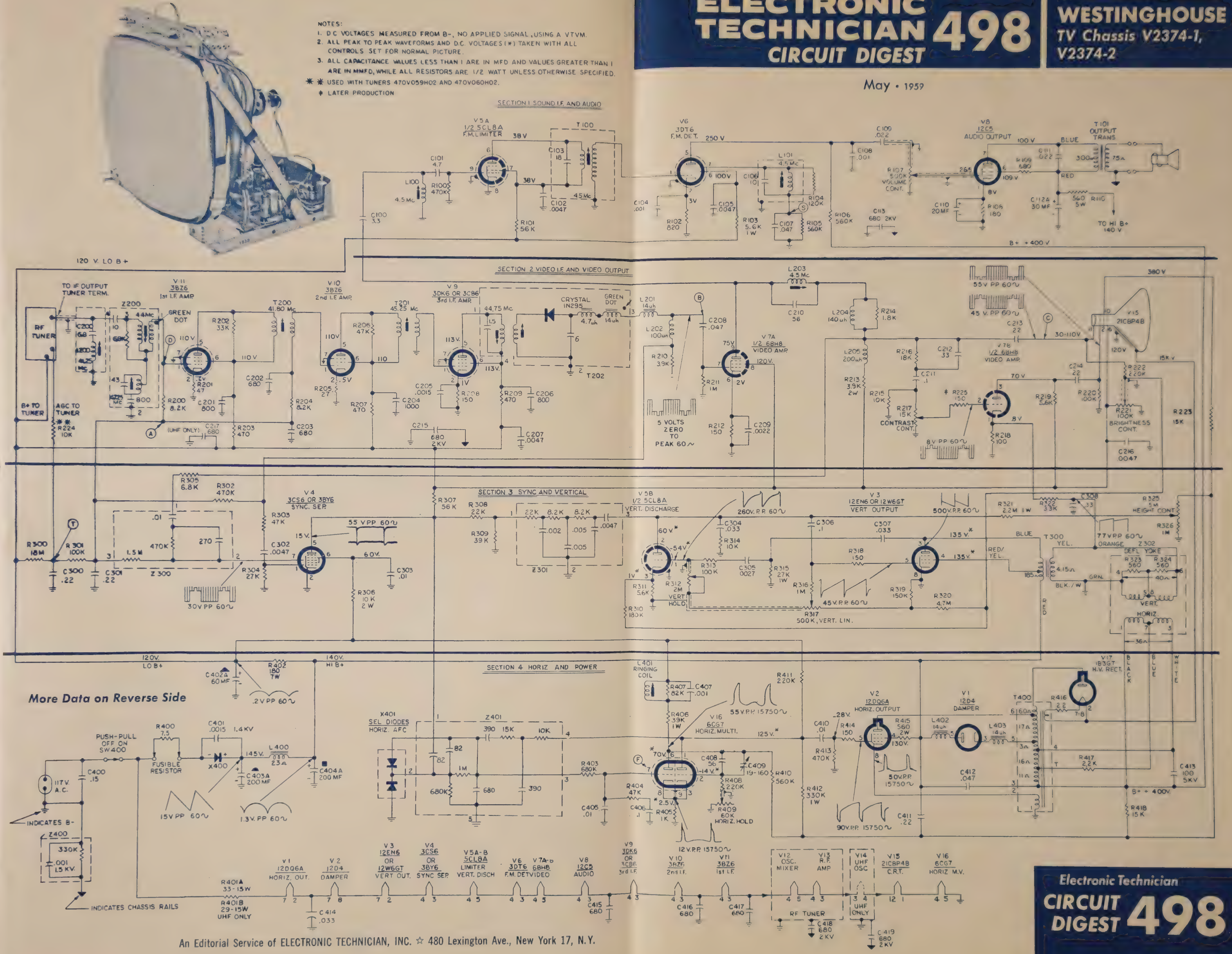
WESTINGHOUSE
TV Chassis V2374-1, V2374-2

May • 1959

NOTES:
1. D C VOLTAGES MEASURED FROM B-, NO APPLIED SIGNAL, USING A VTVM.
2. ALL PEAK TO PEAK WAVEFORMS AND D.C. VOLTAGES (*) TAKEN WITH ALL CONTROLS SET FOR NORMAL PICTURE.
3. ALL CAPACITANCE VALUES LESS THAN 1 ARE IN MFD AND VALUES GREATER THAN 1 ARE IN MMFD, WHILE ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED.

** USED WITH TUNERS 470V059H02 AND 470V060H02.

* LATER PRODUCTION



SECTION 1 SOUND I.F. AND AUDIO
V5A 1/2 5CL8A F.M. LIMITER
V6 3DT6 F.M. DET.
V8 12C5 AUDIO OUTPUT
T100
L101 4.5 Mc
T101 OUTPUT TRANS
R107 500K VOLUME CONT.
B+ +400 V
120 V. LO B+
SECTION 2 VIDEO I.F. AND VIDEO OUTPUT
RF TUNER
TO IF OUTPUT TUNER TERM.
B+ TO TUNER
AGC TO TUNER
V11 3BZ6 1st I.F. AMP.
V10 3BZ6 2nd I.F. AMP.
V9 3DK6 OR 3CB6 3rd I.F. AMP.
CRYSTAL 1N295
V7A 1/2 6BH8 VIDEO AMP.
V7B 1/2 6BH8 VIDEO AMP.
V15 21CBP4B
R217 15K CONTRAST CONT.
R221 100K BRIGHTNESS CONT.
5 VOLTS ZERO TO PEAK 60~
SECTION 3 SYNC AND VERTICAL
V4 3CS6 OR 3BY6 SYNC. SEP.
V5B 1/2 5CL8A VERT. DISCHARGE
V3 12EN6 OR 12W6GT VERT OUTPUT
R312 2M VERT HOLD
R317 500K, VERT. LIN.
R325 5M HEIGHT CONT.
T300
Z302 DEFL YOKE
SECTION 4 HORIZ AND POWER
X401 SEL DIODES HORIZ. AFC
L401 RINGING COIL
V16 6CG7 HORIZ. MULTI.
R409 60K HORIZ. HOLD
V2 12DQ6A HORIZ. OUTPUT
V1 12D4 DAMPER
V17 1B3GT H.V. RECT.
T400
PUSH-PULL OFF ON SW400
117V. A.C.
FUSIBLE RESISTOR
INDICATES B-
INDICATES CHASSIS RAILS
Z400
R401A 33-15W
R401B 29-15W UHF ONLY
V1 12DQ6A HORIZ. OUT.
V2 12D4 DAMPER
V3 12EN6 OR 12W6GT VERT OUT.
V4 3CS6 OR 3BY6 SYNC SEP.
V5A-B 5CL8A LIMITER VERT. DISCH
V6 3DT6 F.M. DET
V7A-B 6BH8 VIDEO
V8 12C5 AUDIO
V9 3DK6 OR 3CB6 3rd I.F.
V10 3BZ6 2nd I.F.
V11 3BZ6 1st I.F.
V12 OSC. MIXER
V13 R.F. AMP
V14 UHF OSC
V15 21CBP4B C.R.T.
V16 6CG7 HORIZ M.V.
RF TUNER
UHF ONLY

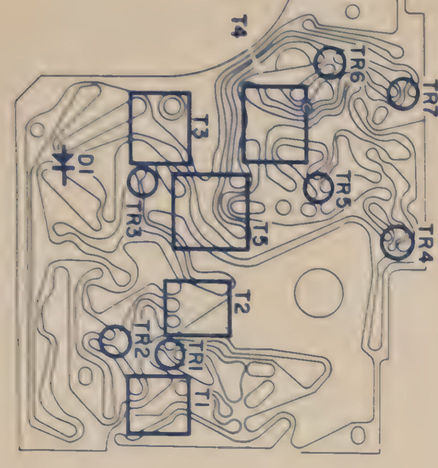
More Data on Reverse Side

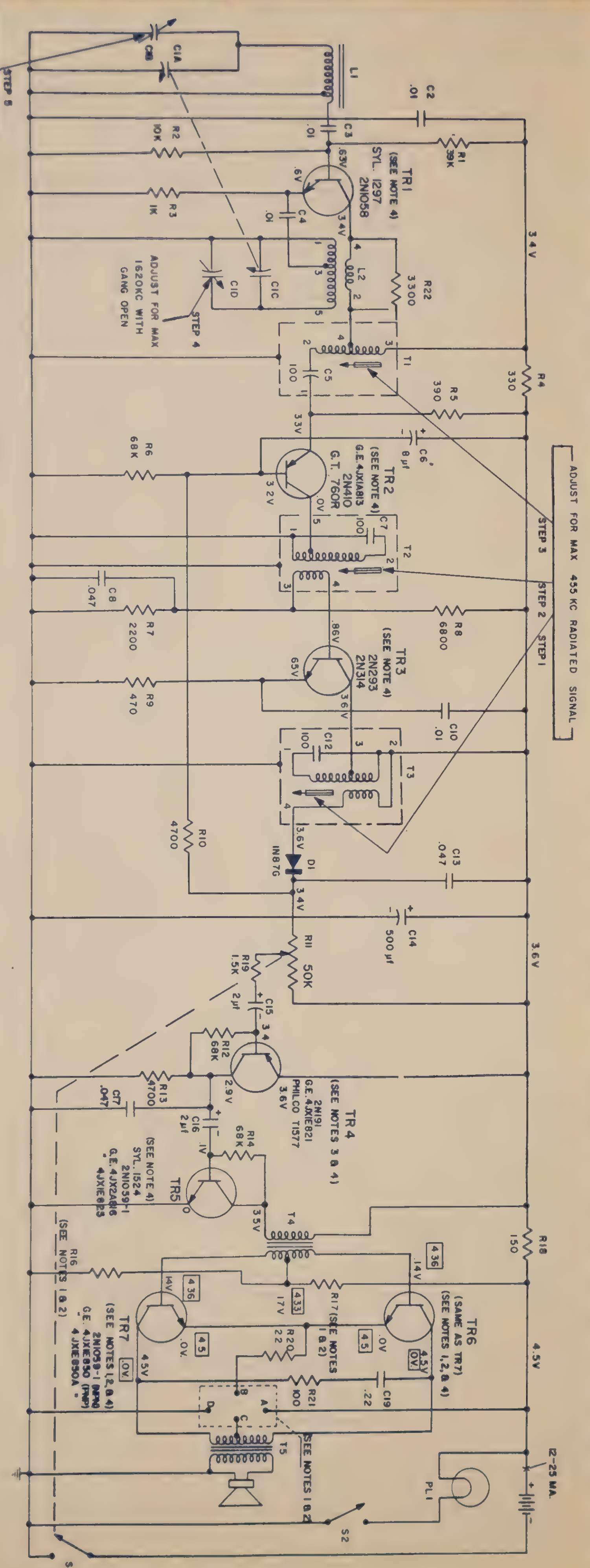
An Editorial Service of ELECTRONIC TECHNICIAN, INC. ☆ 480 Lexington Ave., New York 17, N.Y.

ELECTRONIC TECHNICIAN CIRCUIT DIGEST 499

GENERAL ELECTRIC
Transistor Radio Model P776A

May • 1959


T4
TR6
TR7
T3
D1
TR5
TR3
T5
TR4
T2
TR2
TR1
T1


ADJUST FOR MAX 1400 KC WHILE ROCKING GANG
STEP 5
C1B
C1A
L1
C2 .01
C3 .01
R2 10K
R1 39K
TR1 (SEE NOTE 4) SYL. 1297 2N1058
.63V
6V
R3 1K
C4 .01
.34V
L2
R22 3300
ADJUST FOR MAX 1620KC WITH GANG OPEN
STEP 4
C1D
C1C
3.4V
T1
C5 100
R4 330
R5 390
C6 8μf
R6 68K
TR2 (SEE NOTE 4) G.E.4JX1A813 2N410 G.T. 760R
3.3V
3.2V
C7 100
T2
ADJUST FOR MAX 455 KC RADIATED SIGNAL
STEP 3
STEP 2
STEP 1
C8 .047
R7 2200
R8 6800
TR3 (SEE NOTE 4) 2N293 2N314
.86V
.65V
.36V
R9 470
C10 .01
C12 100
T3
R10 4700
C13 .047
D1 1N87G
3.6V
3.4V
C14 500μf
R11 50K
R19 1.5K
C15 2μf
3.6V
R12 68K
2.9V
TR4 (SEE NOTES 3 & 4) 2N191 G.E. 4JXE82 PHILCO T1577
R13 4700
C17 .047
C16 2μf
R14 68K
TR5 (SEE NOTE 4) SYL. 1524 2N1059-1 G.E. 4JX2A816 4JXE823
3.5V
T4
R18 150
R16 (SEE NOTES 1 & 2)
R17 (SEE NOTES 1 & 2)
TR7 (SEE NOTES 1,2 & 4) 2N1059-1 (NPN) G.E. 4JX2B50 (PNP) 4JXE850A
TR6 (SAME AS TR7) (SEE NOTES 1,2 & 4)
14V
4.36
4.33
4.5
4.5V
0V
R20 22
R21 100
C19 .22
4.5V
T5
SEE NOTES 1 & 2
PL1
12-23 MA
S2
S1

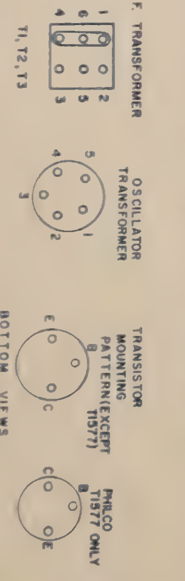
NOTES—

1. FOR NPN TR6 AND TR7
   - A. CONNECT A JUMPER WIRE BETWEEN POINTS B & D.
   - B. " " " " " " A & C. (SEE PHANTOM WIRING DIAGRAM)
   - C. R16 MUST BE 50 OHMS (THERMISTOR).
   - D. R17 MUST BE 1K.
2. FOR PNP TR6 AND TR7
   - A. CONNECT A JUMPER WIRE BETWEEN POINTS A & B.
   - B. " " " " " " C & D. (SEE PHANTOM WIRING DIAGRAM)
   - C. R16 MUST BE 1K.
   - D. R17 MUST BE 50 OHMS (THERMISTOR).
3. T1577 (PHILCO) TRANSISTOR BASE LEAD MUST BE SOLDERED INTO B2 AS SHOWN ON PHANTOM WIRING DIAGRAM. BASE LEAD OF ALL OTHER RECOMMENDED TRANSISTORS FOR TR4 MUST BE SOLDERED INTO B1.
4. REPLACE WITH TRANSISTOR TYPES SHOWN, OR ORDER BY CATALOG NUMBER AS LISTED IN PARTS LIST.
5. UNLESS OTHERWISE NOTED—
   CAPACITORS MORE THAN 1 = MMF
   CAPACITORS LESS THAN 1 = MF
   RESISTORS ARE 1/2 WATT
   K = 1000
6. VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND UNDER NO SIGNAL CONDITIONS
7. VOLTAGES SHOWN IN ☐ ARE WITH TR6 & TR7 PNP.

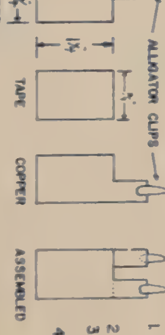
ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM.
CONNECT OUTPUT METER OR SCOPE ACROSS VOICE COIL
INDUCTIVELY COUPLE SIGNAL GENERATOR TO RECEIVER

STEP 1,2 & 3 - SET SIG GEN AT 455 KC, WITH RECEIVER TUNING GANG OPEN
STEP 4 - SET SIG GEN. AT 1620 KC, WITH RECEIVER TUNING GANG OPEN
STEP 5 - SET SIG. GEN AT 1400 KC, TUNE RECEIVER TO 1400 KC

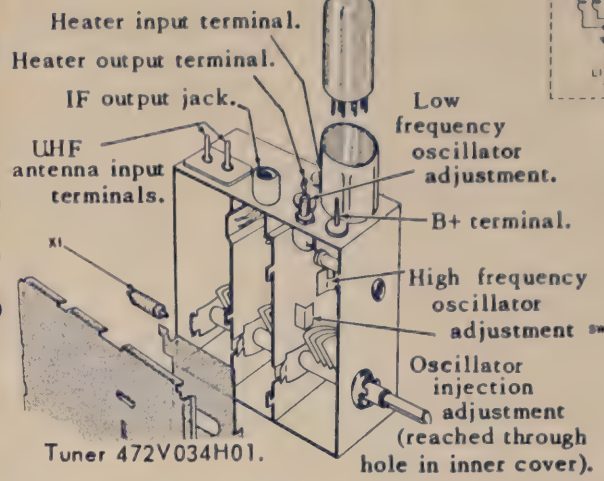

I.F. TRANSFORMER
T1, T2, T3
OSCILLATOR TRANSFORMER
TRANSISTOR MOUNTING PATTERN (EXCEPT T1577)
PHILCO T1577 ONLY
BOTTOM VIEWS
E
B
C

HOW TO CONSTRUCT A BATTERY CURRENT QUESCENT CHECKER


ALLIGATOR CLIPS
1¾
1½
¾
COPPER
TAPE
COPPER
ASSEMBLED

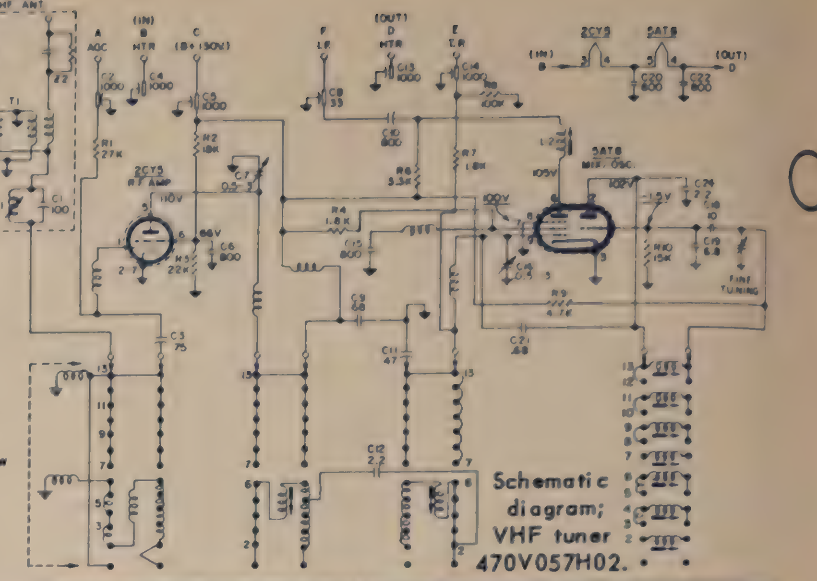
1. CUT OUT FROM A SHEET OF COPPER TWO PIECES AS PER DIMENSIONS.
2. SOLDER AN ALLIGATOR CLIP TO EACH PIECE.
3. CUT OUT A PIECE OF DOUBLE-SIDED MASKING TAPE AS PER DIMENSIONS.
4. PLACE THE PIECES OF COPPER TOGETHER WITH THE MASKING TAPE INSERTED BETWEEN PLATES TO PREVENT PLATES FROM SHORTING.

Electronic Technician CIRCUIT DIGEST 499

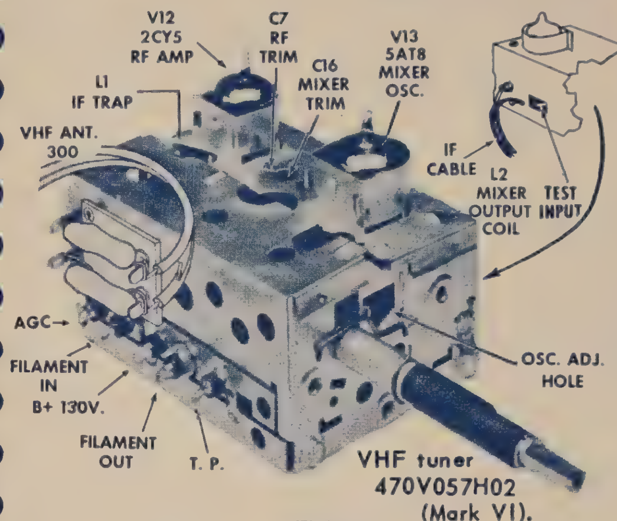

Heater input terminal.
Heater output terminal.
IF output jack.
UHF antenna input terminals.
Low frequency oscillator adjustment.
B+ terminal.
High frequency oscillator adjustment
X1
Oscillator injection adjustment (reached through hole in inner cover).

Tuner 472V034H01.

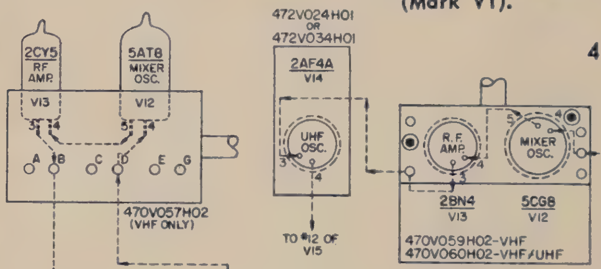
NOTE:
1. ALL CAPACITANCE VALUES IN uuf, ALL RESISTORS 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED.
2. VOLTAGES WITH VTVM. (ANT. TERMINALS SHORTED)


300Ω VHF ANT.
A AGC
B (IN) HTR
C (B+ 130V)
F I.F.
D (OUT) HTR
2CY5 RF AMP
5AT8 MIX-OSC
FINE TUNING

Schematic diagram; VHF tuner 470V057H02.


V12 2CY5 RF AMP
C7 RF TRIM
C16 MIXER TRIM
V13 5AT8 MIXER OSC.
L1 IF TRAP
VHF ANT. 300
IF CABLE
L2 MIXER OUTPUT COIL
TEST INPUT
AGC
FILAMENT IN
B+ 130V.
FILAMENT OUT
T. P.
OSC. ADJ. HOLE

VHF tuner 470V057H02 (Mark VI).

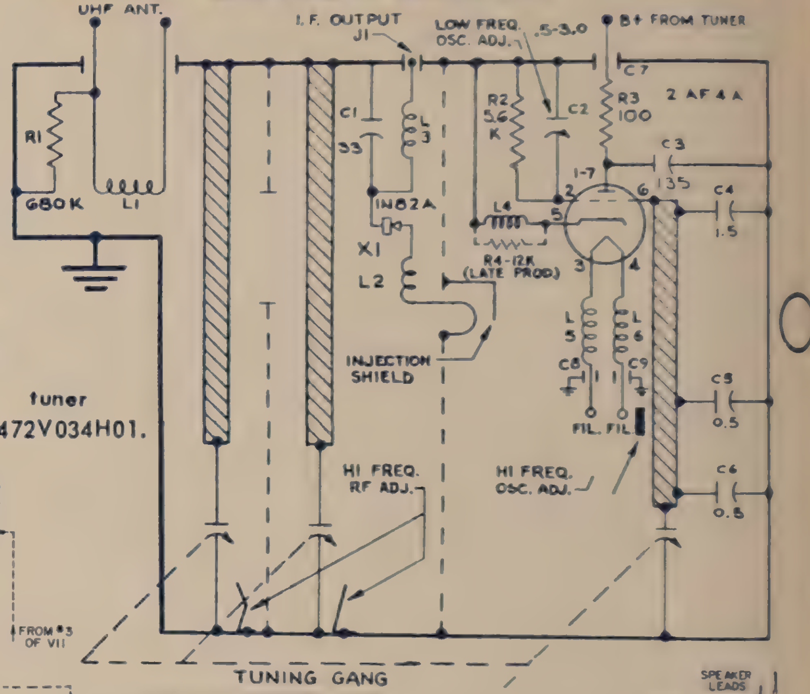

2CY5 RF AMP V13
5AT8 MIXER OSC. V12
472V024H01 OR 472V034H01
2AF4A V14
UHF OSC.
TO #12 OF V15
470V057H02 (VHF ONLY)
R.F. AMP.
MIXER OSC.
2BN4 V13
5CG8 V12
470V059H02-VHF
470V060H02-VHF/UHF
FROM #3 OF V11

WESTINGHOUSE
TV Chassis V2374-1, V2374-2

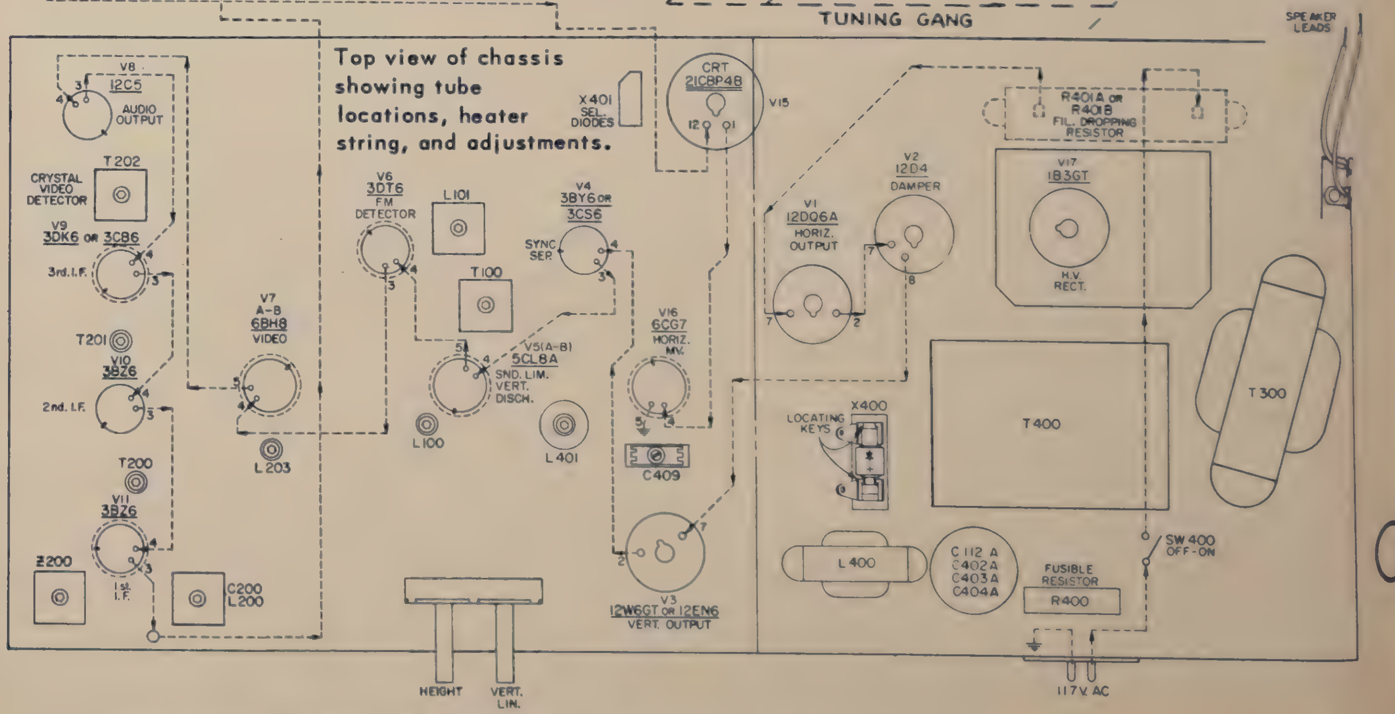
Electronic Technician CIRCUIT DIGEST 498

More Data on Reverse Side

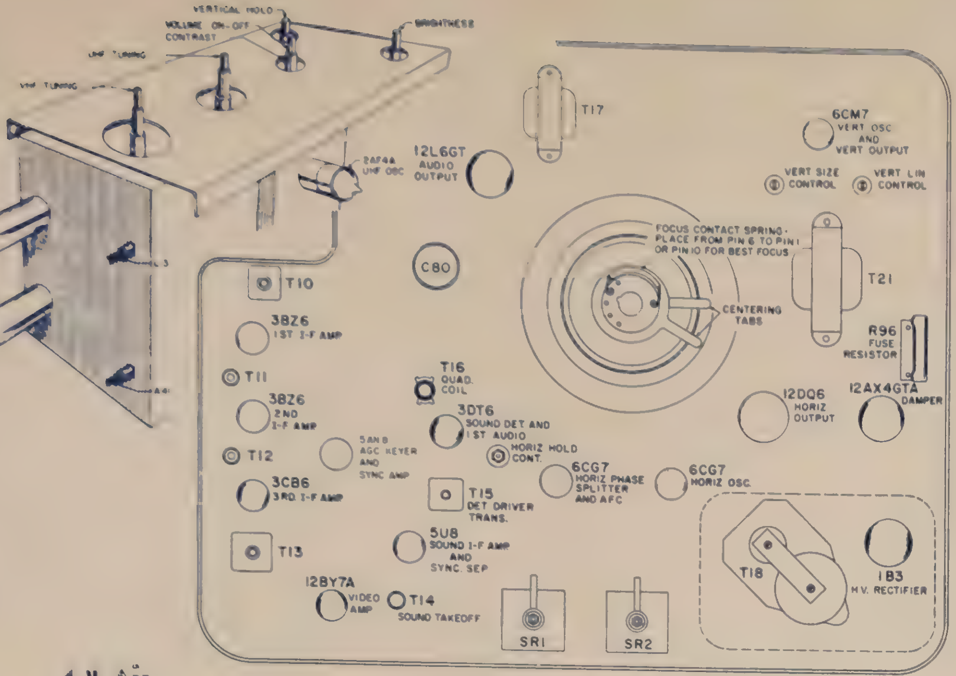
tuner 472V034H01.


300 Ω UHF ANT.
I.F. OUTPUT J1
LOW FREQ. OSC. ADJ. .5-3.0
B+ FROM TUNER
R1 680K
L1
C1 33
L3
1N82A
X1
L2
R2 5.6K
C2
C7
R3 100
2 AF 4 A
C3
L4
R4-12K (LATE PROD)
INJECTION SHIELD
L5
L6
C8
C9
FIL.
C4 1.5
C5 0.5
C6 0.5
HI FREQ. RF ADJ.
HI FREQ. OSC. ADJ.
TUNING GANG

Top view of chassis showing tube locations, heater string, and adjustments.


V8 12C5 AUDIO OUTPUT
X401 SEL. DIODES
CRT 21CBP4B
V15
R401A or R401B FIL. DROPPING RESISTOR
SPEAKER LEADS
CRYSTAL VIDEO DETECTOR
T202
V6 3DT6 FM DETECTOR
L101
V4 3BY6 or 3CS6 SYNC SEP.
V2 12D4 DAMPER
V17 1B3GT H.V. RECT.
V1 12DQ6A HORIZ. OUTPUT
V9 3DK6 or 3CB6 3rd. I.F.
T100
V7 A-B 6BH8 VIDEO
V5 (A-B) 5CL8A SND. LIM. VERT. DISCH.
T201
V10 3BZ6 2nd. I.F.
L203
L100
V16 6CG7 HORIZ. MV.
L401
C409
LOCATING KEYS
X400
T400
T300
T200
V11 3BZ6 1st. I.F.
Z200
C200 L200
HEIGHT
VERT. LIN.
V3 12W6GT or 12EN6 VERT. OUTPUT
L400
C112 A C402A C403A C404A
FUSIBLE RESISTOR R400
SW 400 OFF-ON
117V AC

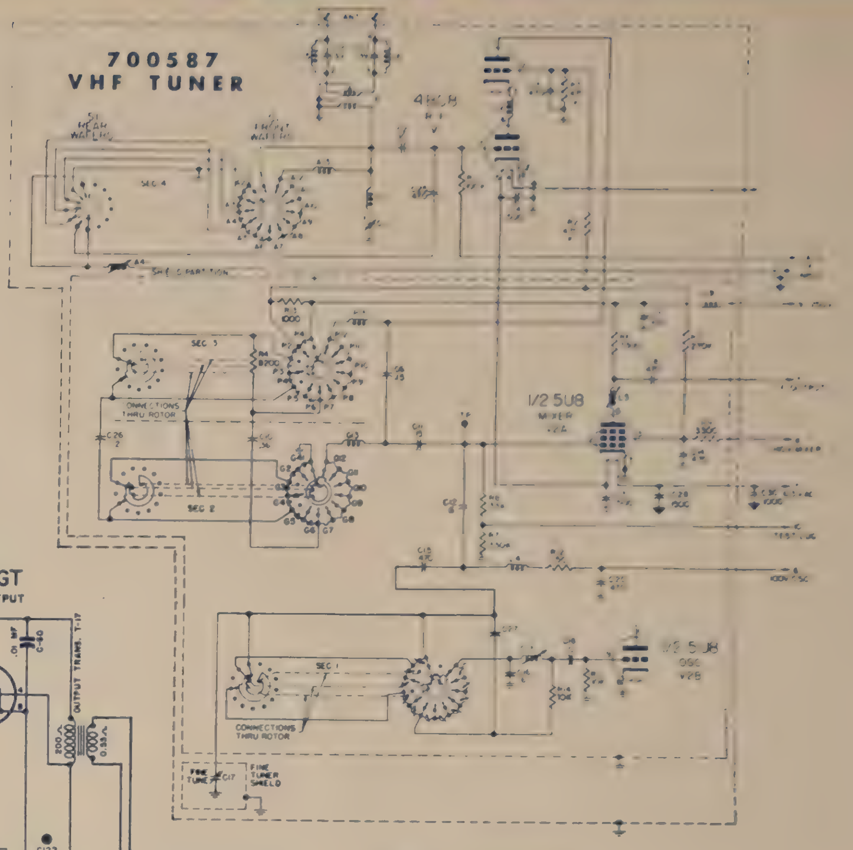
MAGNAVOX
TV Chassis 74 Series

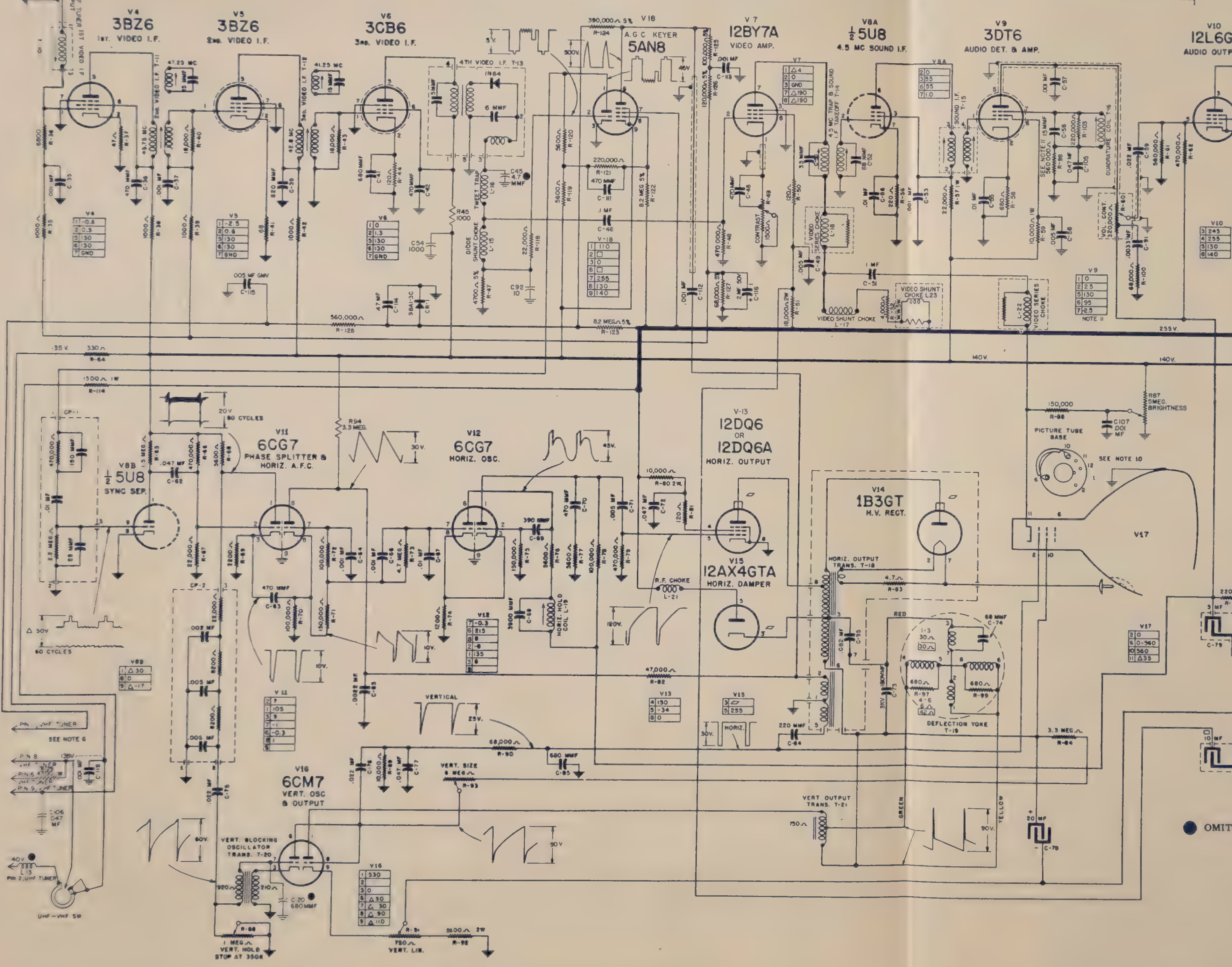

VERTICAL HOLD
VOLUME ON-OFF CONTRAST
BRIGHTNESS
UHF TUNING
VHF TUNING
T17
6CM7 VERT OSC AND VERT OUTPUT
12L6GT AUDIO OUTPUT
2AF4A UHF OSC
VERT SIZE CONTROL
VERT LIN CONTROL
C80
T10
FOCUS CONTACT SPRING-PLACE FROM PIN 6 TO PIN 1 OR PIN 10 FOR BEST FOCUS
T21
CENTERING TABS
R96 FUSE RESISTOR
3BZ6 1ST I-F AMP
T11
T16 QUAD COIL
12DQ6 HORIZ OUTPUT
12AX4GTA DAMPER
3BZ6 2ND I-F AMP
3DT6 SOUND DET AND 1ST AUDIO
5AN8 AGC KEYER AND SYNC AMP
HORIZ HOLD CONT
T12
3CB6 3RD I-F AMP
T15 DET DRIVER TRANS.
6CG7 HORIZ PHASE SPLITTER AND AFC
6CG7 HORIZ OSC
T13
5U8 SOUND I-F AMP AND SYNC SEP
T18
1B3 H.V. RECTIFIER
12BY7A VIDEO AMP
T14 SOUND TAKEOFF
SR1
SR2

# Measured from SR1 output.
TP - Tie Point
NC - No Connection
* Measured from Pin 3 of V15
**Measured from Pin 8 of V10
● Varies with Control setting
●●Depends on condition of electrolytic

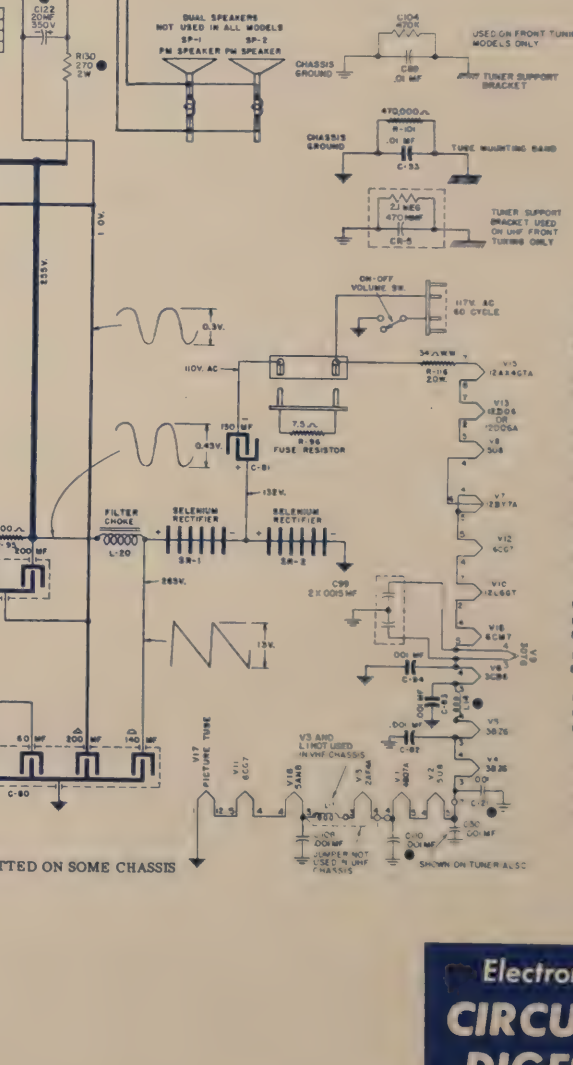
RESISTANCE MEASUREMENTS

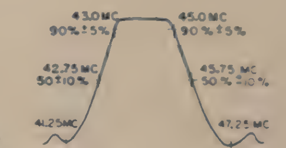
REF	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V1	5U8	**5000	360K	**47K	5.5	7.5	#4800	0	0	10K
V2	4BQ7A	#1500	230K	INF	5.5	6.5	INF	600K	0	0
V4	3BZ6	75K	47	9	10	**1000	**1000	0	-----	-----
V5	3BZ6	69K	68	8	9	**1000	**1000	0	-----	-----
V6	3CB6	1	120	7.5	8	**1000	**1000	0	-----	-----
V7	12BY7	●140	470K	0	15	15	16	#4100	#18K	0
V8	5U8	**1.5meg	8	**22K	16	17	**22K	220	0	2.2 meg
V9	3DT6	7	680	4	3.0	#320K	**10K	560K	-----	-----
V10	12L6	NC	11	#270	#54	250K	TP	14	●●20K	-----
V11	6CG7	**5600	20K	2200	15	13	40K	350K	100K	0
V12	6CG7	#100K	150K	1200	1.5	3	#8000	5 meg	1200	0
V13	12DQ6	TP	17	TP	*10K	470K	TP	22	0	Top Cap *7.5
V14	1B3GT	INF	INF	INF	INF	INF	INF	INF	INF	Top Cap *260
V15	12AX4GT	NC	NC	●●20K	NC	#54	TP	24	22	-----
V16	6CM7	*730	NC	215	11	10	●*4 meg	●550K	●*4 meg	●7000
V17	21ATP4	0	78K	Pin 6 *10.5	Pin 10 ●10.5	Pin 11 ●330K	Pin 12 1.5	-----	-----	-----
V18	5AN8	**11K	27K	0	4	5	160K	#56	**200K	**0
V601	2AF4	**1200	22K	5	5.5	1.1	22K	**1200	-----	-----


700587
VHF TUNER
SEC. 4
SEC. 3
SEC. 2
SEC. 1
1/2 5U8 MIXER
1/2 5U8 OSC
CONNECTIONS THRU ROTOR
FINE TUNING
FINE TUNER SHIELD


V4 3BZ6 1st. VIDEO I.F.
V5 3BZ6 2nd. VIDEO I.F.
V6 3CB6 3rd. VIDEO I.F.
V18 A.G.C. KEYER 5AN8
V7 12BY7A VIDEO AMP.
V8A 1/2 5U8 4.5 MC SOUND I.F.
V9 3DT6 AUDIO DET. & AMP.
V10 12L6GT AUDIO OUTPUT
4TH VIDEO I.F. T13
1N64
VIDEO SHUNT CHOKE L-17
SOUND I.F.
QUADRATURE COIL
VOL. CONT.
OUTPUT TRANS. T-17
255V.
140V.
140V.
RB7 5MEG. BRIGHTNESS
PICTURE TUBE BASE
SEE NOTE 10
V8B 1/2 5U8 SYNC SEP.
V11 6CG7 PHASE SPLITTER & HORIZ. A.F.C.
V12 6CG7 HORIZ. OSC.
V-13 12DQ6 OR 12DQ6A HORIZ. OUTPUT
V14 1B3GT H.V. RECT.
V15 12AX4GTA HORIZ. DAMPER
V17
HORIZ. OUTPUT TRANS. T-18
R.F. CHOKE L-21
HORIZ. HOLD COIL L-19
DEFLECTION YOKE T-19
RED
GREEN
YELLOW
VERTICAL
V16 6CM7 VERT. OSC & OUTPUT
VERT. BLOCKING OSCILLATOR TRANS. T-20
VERT. SIZE
VERT. OUTPUT TRANS. T-21
1 MEG. VERT. HOLD STOP AT 350K
VERT. LIN.
60 CYCLES
C-80
UHF-VHF SW

● OMITTED ON SOME CHASSIS


DUAL SPEAKERS NOT USED IN ALL MODELS
SP-1 PM SPEAKER
SP-2 PM SPEAKER
CHASSIS GROUND
TUNER SUPPORT BRACKET
USED ON FRONT TUNING MODELS ONLY
TUNE MOUNTING BAND
TUNER SUPPORT BRACKET USED ON UHF FRONT TUNING ONLY
ON-OFF VOLUME SW.
117V. AC 60 CYCLE
110V. AC
FUSE RESISTOR
FILTER CHOKE L-20
SELENIUM RECTIFIER SR-1
SELENIUM RECTIFIER SR-2
C-75
C-90
V17 PICTURE TUBE
V3 AND L1 NOT USED IN VHF CHASSIS
SHOWN ON TUNER ALSO



VOLTAGE READINGS TAKEN WITH VACUUM TUBE VOLTMETER BETWEEN SOCKET LUGS AND CHASSIS GROUND, WITH NO SIGNAL INPUT AND CONTRAST AT MINIMUM.
INPUT VOLTAGE 117V AC.

ALL VOLTAGES ARE D.C UNLESS OTHERWISE SPECIFIED.

△ INDICATE VOLTAGE VARIATIONS WITH CONTROL SETTINGS, OR SIGNAL INPUT LEVEL

▱ DO NOT MEASURE AT THESE POINTS.

C-118 LOCATED ON CHASSIS BASE ON UHF MODELS

DOTTED LINE & C-118 LOCATED ON VHF TUNER (VHF MODELS ONLY)

RESISTANCE VALUES OF COILS SHOWN IN BOXES IS RESISTANCE OF WINDING WHEN REMOVED FROM CIRCUIT.

RESISTANCE VALUES OF COILS UNDER 1 OHM IS NOT SHOWN.

MOUNT FOCUS CONTACT SPRING BETWEEN PIN 6 AND EITHER PIN 1 OR PIN 10 OF PICTURE TUBE BASE TO OBTAIN BEST FOCUS

MEASURE ACROSS R-96 -2.5V

C-117 68MMF ON TOP TUNING MODELS. 56MMF ON FRONT TUNING MODELS

An Editorial Service of ELECTRONIC TECHNICIAN, INC. ☆ 480 Lexington Ave., New York 17, N.Y.

Circuit Digest No.

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PILOT

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Hi-Fi Audio Amplifier and Pre-amplifier, Model AA-920	**370**
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RADIO CRAFTSMEN

Chassis 17T1: Model M1733A, C1735A, C1736A. Chassis 17T2: Model M-1734A. Chassis 21T1. Model M-2107A, C-2108A, C-2110A, C-2111A. Chassis 21T2: Model C-2109A	**16**
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RAYTHEON

Chassis 17T18 (Challenger series): Models M-1750A, M-1750C, M-1750G, M-1750K, M-1751D, M-1751F, M-1752E, M-1752L	**141**
Chassis 21T8: Models UM-2133, UM-2134, UM-2135, UM-2136, UM-2139, UM-2141, UM-2142, UM-2144, UM-2145	**94**
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All Units Are TV Receivers Unless Otherwise Noted

Chassis KCS113M, KCS113N: Models 24-T-8325, 24-T-8325U, 24-T-8327, 24-T-8327U, 24-T-8335, 24-T-8335U,2 4-T-8337, 24-T-8337U	**391**
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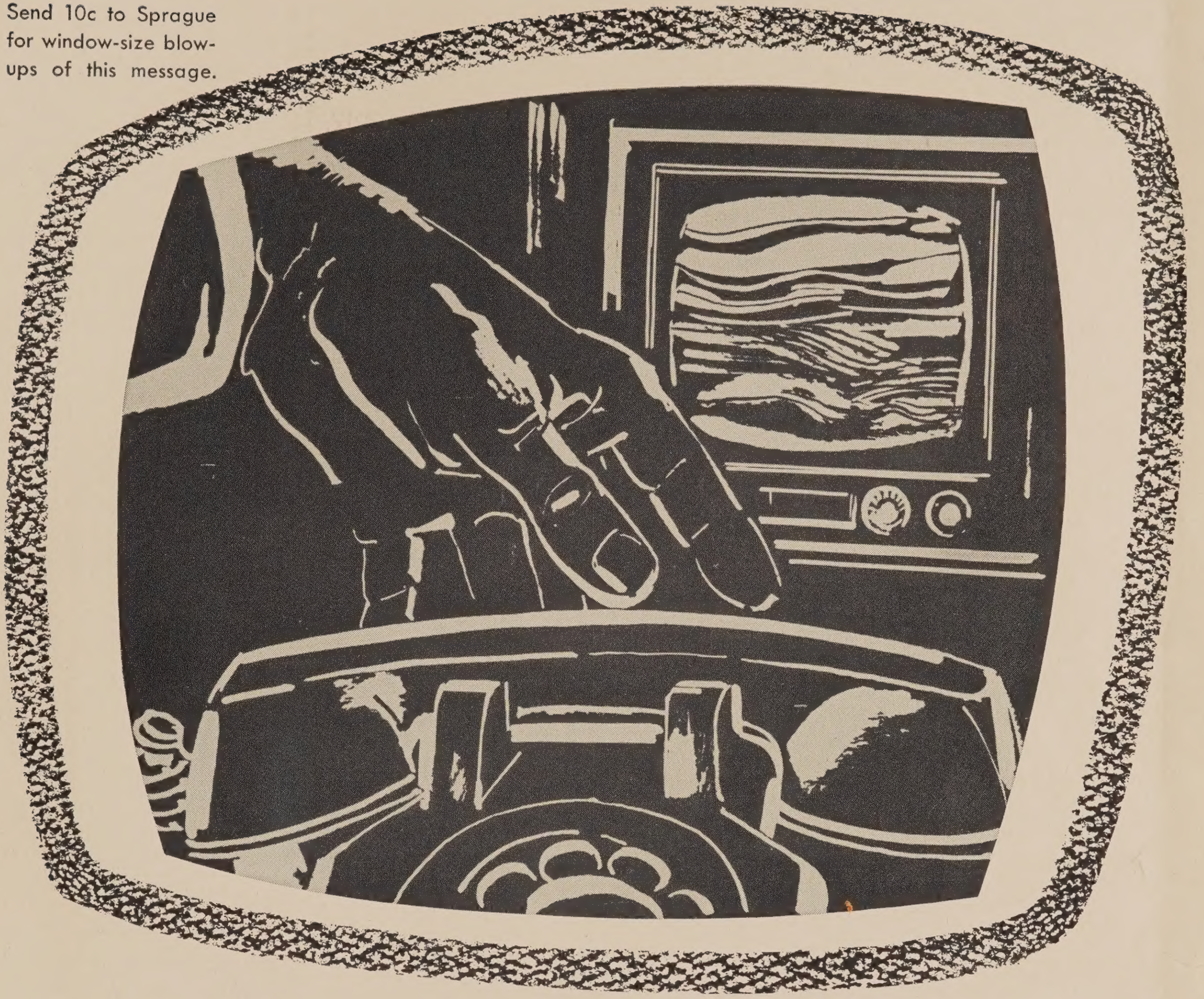

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